OCT 9 1928

VOLUME IX SEPTEMBER, 1928 NUMBER 9

Medical Library

ARCHIVES OF PHYSICAL THERAPY, X-RAY, RADIUM

WITH

INTERNATIONAL ABSTRACT

Official Journal American College of Physical Therapy

EDITORIAL STAFF

DISRAELI KOBAK, M. D., Editor

GEORGE C. ANDREWS, M. D. - - New York
ALBERT BACHEM, Ph. D. - - - - Chicago
R. C. BAUMGARTEN, M. D. - - - Seattle
WILLIAM L. CLARK, M. D. - - Philadelphia
HARRY H. BOWING, M.D., Mayo Clinic, Rochester
IRA O. DENMAN, M. D. - - - - Toledo
J. C. ELSOM, M. D. - - - - - Madison
F. H. EWERHARDT, M. D. - - - St. Louis
R. E. FRICKE, M. D. - Mayo Clinic, Rochester
J. U. GIESY, M. D. - - - Salt Lake City
ABRAHAM J. GOTTLIEB, M. D. - Los Angeles
E. N. KIME, M. D. - - - - - Indianapolis
HARRY LESLIE LANGNECKER, M. D., Stanford U.
PROF. VICTOR E. LEVINE - - - - - Omaha
HORACE LOGRASSO, M. D. - Perrysburg, N. Y.
EDGAR A. MAYER, M. D. - - Saranac Lake
ROSWELL T. PETTIT, M. D. - - Ottawa, Ill.
CURRAN POPE, M. D. - - - - Louisville
CHAS. E. STEWART, M. D. - - Battle Creek
F. H. WALKE, M. D. - - - - - Shreveport
A. D. WILLMOTH, M. D. - - - Louisville

ELKIN P. CUMBERBATCH, M. A., MB., (Oxon) M. R. C. P., London
GUIDO HOLZKNECHT, Dr. Med. - - - - - - - Vienna
A. ROLLIER, M. D. - - - - - - - Leysin, Switzerland
ALBERT E. STEIN, Dr. Med. - - - - - - - Wiesbaden
AXEL REYN, M. D. - - - - - - - - - Copenhagen
FRANZ NAGELSCHMIDT, Dr. Med. - - - - - - - Berlin
DR. JOSEF KOWARSCHIK - - - - - - - - - Vienna
SIR HENRY GAUVAIN, M. D., M. Ch. - - - Alton, England

ALBERT F. TYLER, M. D., Managing Editor

Published Monthly. Annual Subscription, United States and Canada, $5.00; Foreign, $6.50.

Copyright, 1928, by Magic City Printing Co., Omaha.

Clinical Congress of Physical Therapy

and

Seventh Annual Meeting

American College of Physical Therapy

Chicago

October 8 to 13, 1928

Stevens Hotel

International Program
Instruction Classes
Scientific Exhibits
Trade Exhibits
Clinics
FIVE FULL DAYS!

ARCHIVES OF
PHYSICAL THERAPY, X-RAY
RADIUM

VOL. IX SEPTEMBER, 1928 No. 9

OBSERVATIONS ON THE USE OF DIATHERMIA FOR THE PREVENTION AND TREATMENT OF SURGICAL SHOCK*

U. V. PORTMANN, M.D.

Cleveland Clinic,
CLEVELAND, OHIO

The use of diathermia in the treatment and prevention of surgical shock is based upon certain experiments which were made a number of years ago. Dr. Crile found that cooling of the liver is one of the most important factors in the production of shock in abdominal operations. In a series of animal experiments Nagelschmidt found that the amplitude and volume of respiration and the heart beat are increased when diathermia is applied through the mediastinum.

An interesting and convincing series of animal experiments to determine the heating effects of diathermia have been performed by Dr. Carl Binger and Ronald Christie, M. D., of the Hospital of the Rockefeller Institute and reported in the Journal of Experimental Medicine for October of this year (1927, XLVI, 571-600). Everyone who is interested in or is skeptical as to the heating effects of diathermia should read this report which confirms our clinical observations and experiments. The following conclusions offered by Binger and Christie will bear repetition:

(1) "Experimental evidence is furnished to show that in normal animals the rectal temperature can be elevated by the passage of high frequency currents."

(2) "During life the intra-abdominal and intrathoracic temperatures can be increased only slightly above the rectal temperature."

(3) "The lung temperature in the anesthetized dog normally lies from 0.3 to 0.4° C. below the rectal temperature. During the passage of diathermy currents of strengths equivalent to those used in therapy this relationship is reversed, the lung temperature exceeding the rectal temperature by about the same value."

(4) "Immediately after death the temperature rises abruptly in deep tissues between the electrodes."

(5) "Prevention of the access of air to one lung, while its circulation is intact, results in little, if any, change in the rate of heating of the lung by the diathermy current."

(6) "Occlusion of a main branch of the pulmonary artery during the flow of the current results in a sudden rise in temperature in the lung whose artery has been occluded, with subsequent heating, however, at the original rate. Under these circumstances death of the animal is accompanied by a precipitous rise in the temperature of both lungs."

(7) "When the pulmonary veins as well as the artery to one lung are ligated, the circulation

*Read at sixth annual meeting, American College of Physical Therapy, Chicago, Nov. 3, 1927.

through the bronchial vessels is also stopped. Diathermy then results in a local rise in temperature in the lung equivalent to that seen in the other lung after death."

(8) "The temperature of the right heart blood normally exceeds that of the left heart blood by 0.05-0.2° C. During the application of high frequency currents to the thorax this relationship is reversed."

(9) "This indicates that the lungs are being heated, but that the blood passing through the pulmonary vessels is removing the heat at approximately the rate of production."

From these investigations it is evident that the body is actually heated by diathermia; and that the lungs are heated when the current is passed through them, but that the heat is dissipated by the pulmonary circulation and not by the respiratory air exchange, which is desirable for the heating of a patient and confirms our clinical experience. However, this does not take into account the case of a consolidated diseased lobe, a lung in which there is stasis of the circulating blood and of other fluids, so that the conduction must be quite different. Though this condition was simulated in the experiments in which the pulmonary veins and their branches were occluded, a considerable rise in temperature was indicated.

It is a well-known fact that when the temperature is lowered, chemical and metabolic processes are diminished. It is also well known that one of the most valuable methods of treating or preventing shock is the application of heat. This fact was abundantly illustrated during the war by the exceptionally high operative mortality rate which attended operations during the cold seasons or in unheated field hospitals, especially in abdominal cases—this mortality rate being higher by far than that which attended similar operations during the warm weather or when the patients could be kept warm.

Because of these experimental and clinical observations we concluded that it would be possible to improve the status of our patients by the prevention of undue cooling of the abdominal viscera at operation or after operation. This we were able to accomplish by applying diathermia through the liver, the base of the lungs and the heart during and after hazardous operations. In abdominal cases, in bad-risk cases in particular, we have demonstrated repeatedly by thermometer readings that by this means the temperature of the liver is either raised or at least is kept at a normal level during and after the operative procedure, which is not true in untreated cases.

In applying the diathermia we use well-lathered metal electrodes which are usually about four by six inches in area, although their size depends upon the size of the patient. An electrode is placed on each lateral chest wall below the axilla so that they are directly opposite to each other and the heated zone includes the liver area. The electrodes are held in place by large, dry rubber sponges under a snug cloth binder. Preferably the treatment is begun before anesthesia is induced so that the patient can indicate when a comfortable degree of warmth is attained, but if the patient is unconscious, from 800 to 2400 miliamperes of current are used, the amperage depending upon the size of the electrodes in use. The electrodes are soldered to the cord terminals so that they can not become detached, thus preventing the possibility of sparking between the electrode and the patient. I may state that only nitrous oxid-oxygen anesthesia is used in our hospital. When ether or any other explosive anesthetic is employed, every precaution should be taken to prevent sparking and the diathermia apparatus should be moved to a distance by the use of long cords.

In certain cases in which it is desirable to raise the temperature of the whole body a long, well-lathered metal electrode is applied longitudinally to the calf of each leg or to one leg and to the opposite forearm. These electrodes are of equal size and are not placed around the limb, that is, by the cuff method, but are placed along the limb, and are held in place by loosely applied elastic bandages. This method is particularly useful in other than abdominal cases, and in the treatment of debilitated patients in bed. We have used this method in the treatment of patients who have had severe hemorrhage—always, of course, after the transfusion of whole blood. The results in these cases have been very gratifying, and in fact, somewhat spectacular. We have frequently demonstrated by

rectal thermometers that the temperature of the body may thus be raised one or two degrees.

In our early use of diathermia we usually applied the electrodes to the soles of the feet. In two cases a thermic ulceration developed at the attachment of the tendo achilles to the os calcis. It was difficult to determine the cause of these disasters, since all the technical details of the application were correct, and the patients were not conscious of burning sensation. However, I finally concluded that the metal bed springs had created a considerable inductance and that with the insulation of mattress and rubber cover-sheet had caused a sort of condensation effect, which had produced a great concentration of heat at the heels. Because of these experiences the practice of placing the electrodes on the soles of the feet has been discontinued.

Two of our early cases may illustrate the value of this use of diathermia. In one, the patient, a doctor, had a carcinoma of the thyroid which had recurred after operation and radiation and it was thought advisable to remove the remaining portion of the tumor. At operation it was found that the neoplasm had invaded the deep structures of the neck and was surrounding the carotid artery, so that it was necessary to remove a section of this vessel with the tumor. A state of shock developed and the application of diathermia was started immediately. Before the operation was completed the patient had reacted favorably and all evidences of shock had disappeared. The diathermia was continued for two hours after the patient was returned to bed in order to prevent any recurrence of the shock. The patient quickly regained consciousness, was warm and comfortable, and made an uneventful recovery after a very serious and hazardous procedure.

In another case, during the night following a hysterectomy the patient had a severe hemorrhage from a small vessel from which a ligature had slipped. The patient was taken to the operating room, the bleeding vessel was retied, a transfusion of whole blood was given and diathermia was applied at once. The patient, who was unconscious, had a cold, clammy skin, a rapid, thready pulse, and exhibited all the classical evidences of shock from hemorrhage; but within an hour the entire picture was changed and the patient had become warm and comfortable and safe.

For two years we have used diathermia in many cases either for the treatment or the prevention of shock, or during the convalescence of debilitated patients, and have seen no ill effects from the procedure. It is obviously impossible to quote statistics or to make any analysis of groups of cases, since the results are only comparative. We are convinced, however, that the status of patients thus treated is definitely improved both during and after operation and the application of diathermia is now a routine procedure on our surgical service. We look upon the method as a valuable safeguard and though in many cases it may not be needed, there are occasional cases in which it may be the deciding factor between life and death; and therefore it is used in all cases.

On the basis of the work of Dr. Harry E. Stewart in the treatment of pneumonia, we have also attempted to treat and prevent severe post-operative pulmonary complications. Fortunately we see but few cases of lobar pneumonia in our hospital, but we have been gratified with the results obtained in those cases which have been treated with diathermia at a sufficiently early stage of the disease. It is now our aim to prevent the development of pneumonia by the immediate application of diathermia to the chest of any patient in whom an unexplainable rise in temperature with increased respiratory rate and pulse rate occurs, whether or not the complete clinical picture of pneumonia is presented. Doubtless we are thus treating some cases of simple bronchitis or of pulmonary collapse, but even in such cases improvement is usually observed within from twenty-four to forty-eight hours, an observation which makes us believe that this attempt to prevent or abort serious pulmonary disease is very much worth while.

DISCUSSION

DR. GUSTAVUS BLECH: I see in the whole problem of the application of diathermy, once it becomes known to the general operator that in the machine lies the salvation for shock or post-operative pneumonia, a sort of panacea, a certain amount of danger. That danger is manifest not only here in Chicago, but in most hospitals wherever I have been, even in the

larger cities. The technic of general ether anesthesia, if you please, with or without gas, is not carried out scientifically as it should be and gives no particular thought to the possibility of after effects. If a patient is taken into the operating room in a very bad condition, the surgeon pays particular attention to preparation, but in the average abdominal case, the patient is rushed into the operating room without adequate preparation and even without teaching the patient the ordinary fundamentals to prevent bad consequences.

In the first place, until they invented all this machinery, they spoke a good deal in America about the value of ether drop anesthesia. Wherever I was called in to do an operation and saw the young interne do the anesthetic work, he dropped the anesthetic in the most allopathic doses I ever saw; he just streamed it. We know ether has caused less danger than chloroform, but you are safe with ether, if you are careful. However, I could not understand calling it the drop method simply because they dropped it. The drop method, as we understand it scientifically, is to give it not only drop by drop at a rate of about eighty or ninety a minute, but to give it at a very great height for the purpose of splitting up each drop into particles, because the best diluent, the best antidote and the best safety measure for ether is air, and if you can pour enough air into the human being with your carefully administered ether, you are all right.

The ideal operation should go on something like this: Before your patient goes into the operating room, the evening before, or in an emergency case immediately before, teach the patient breathing exercises by military command, in, out, inhale, exhale, whatever arrangement you wish to make, and practice it with the patient the evening before or immediately before operation. If you have a good anesthetist and you have good team work, the moment you put in the last stitch in the peritoneum and the sutures are made and the dressing is on, the patient should be absolutely awake, otherwise your anesthesia was not very well carried out. The moment the patient is half awake, give the command, take a breath in, out, and they respond. What do they do? They eliminate the ether. You get the respiratory system functioning. It is a purely physiological method of avoiding danger.

Then, of course, comes sitting up in bed. I undertook a job of doing a prostatectomy on a man who already had a very severe toxic condition and had what was diagnosed by the best internists as a hyporstasis of the lungs. As soon as he was out of the operating room, he never saw his bed. I put him in a chair. The position counts a lot.

Dr. Emil C. Junger (Soldier, Iowa): I am a thorough believer in prevention. The best treatment for shock is prevention. If you have ever been a patient in a hospital and had to go through the preparation that we used to put them through twenty-five or thirty years ago, you know we couldn't avoid having shock. We took the patient into the hospital a couple of days before and physicked him severely. A well person would have shock whether he had an operation or not, with just the treatment that he had to go through getting ready. For twenty-five years I have used a hypo of HMC the night before so as to induce sleep, and then maybe another one befor the operation, and I have not disturbed the intestinal tract at all. We used to get accident cases that had had no preparation whatsoever, and they stood the operation the very best and had no danger and no trouble.

Shock is due to some injury to the nervous system. We are sensitive organisms, and whenever we do something to disturb the equilibrium, something happens. If we can just take the system as it is and disturb it as little as possible (of course, you have to take that as I mean it, we must have a certain amount of preparation, and we must do it right), we will get better results. Twenty or thirty years ago we wanted to do so much, and we did a lot of harm.

Dr. Norman E. Titus (New York): I think the use of diathermy in connection with the surgical service of a hospital is a procedure that should be encouraged and also further investigated. It is the idea in the Presbyterian Hospital in New York to combat postoperative pneumonia. We have been trying to organize in our transitional stage of the hospital a service to give diathermy before operation to all cases that have any rales in the chest.

There is nothing to report about that yet. We have no conclusive evidence, but we feel that such a procedure is indicated when a patient comes in with an acute surgical condition and shows evidence of any irritation of the lungs, probably to prevent a postoperative pneumonia.

It might be interesting to tell you one observation that we have made in post-operative pneumonia, and that is, that where we find patients getting increased pulse and respiration rate, and rise in temperature from unexplained cause, it is a regular procedure to take x rays of the patient's chest. It has been observed in the x rays that have been taken over the last five or six years that the pneumonic process, when it is occurring, does not begin in the center of the lung, as we used to learn in the medical school, a central pneumonia, but rather that the pneumonic process starts on the surface of the lung and extends in, as a pyramid or wedge. No physical signs are found until that wedge hits a bronchus transmitting the breathing sounds through hardened lung tissue or indurated congestion. With this idea we feel if we can get heat even superficially, or get the blood circulation of the lung increased with diathermy, we might be able to keep this irritation of the lung and post-operative pneumonia on the surface and give the body from the inside of the lung a chance to recover.

We haven't had an opportunity in New York to test the benefits of diathermy more in surgical shock. No doubt, Portman's work will be appreciated in due time. The surgeon must be in a position to attest to the merits of such a procedure after thorough trial. The work at the Cleveland Clinic in this regard must be taken at full value.

THE THERAPEUTIC VALUE OF DIATHERMY IN UROLOGY*

LEWIS WINE BREMERMAN, M.D.

Director, Bremerman Urological Clinic

CHICAGO, ILLINOIS

After a number of years of application of diathermy in the treatment of pathologic conditions of the urogenital organs our experience warrants us in concluding that diathermy has a definite place in the therapeutic armamentarium of urology and results have been sufficiently gratifying for us to recommend a more general use of this method of treatment both medically and surgically.

Your time will not be consumed in a discussion covering the technique of diathermy as practiced in urology. We will endeavor to cite results obtained and the applicability of this form of treatment to various lesions of the urogenital organs.

The specialist and general practitioner is ever on the alert seeking newer, better and more scientific methods of treatment in acute Neisserian infection of the urethra. Diathermy has been suggested as a remedy to employ for the purpose of eradicating the infection, hastening the alleviation of symptoms, and in materially reducing the duration of the disease. It has been taught that the diplococcus of Neisser could not exist and function if the culture tube was heated to a maximum of 110° F. This is unquestionably true and led experimentors to devise methods of technic whereby the tissue of the urethra and contiguous structures could be heated to this maximum without materially lowering the normal resistance of these tissues. Diathermy seemed to be a method which would answer these requirements.

We have experimented both in private and dispensary practice on a large number of patients by various methods of application, but we must admit defeat as results proved that the treatment as practiced by us was followed with no benefit. We will not admit complete defeat, however, for we have a strong conviction that the use of heat in the treatment of acute gonorrheal urethritis should be followed by definite beneficial results. We hope by improvement in our technique to give more favorable results at some future time.

In the treatment of some of the complications associated with gonorrheal urethritis we have proven that diathermy plays a very important role. In acute prostatitis diathermy is employed by us routinely; administered with one electrode supra-pubically applied and the other through a prostatic electrode placed within the rectum in such a manner as to be contiguous to the prostate. The intensity of the heat is gradually increased to 108° to 110° F., held for about fifteen minutes and gradually reduced. Local treatment to the antero-posterior urethra is given as usual. Treatments are given daily and usually within two or three days the danger of the development of a prostatic abscess is aborted.

Diathermy is exceedingly efficacious in acute epididymitis if employed early during the first twenty-four hours of its development. After the condition becomes advanced diathermy has little or no beneficial effect. In chronic inflammatory conditions of the urethra, prostate and seminal vesicles diathermy has given us the best results. Without doubt diathermy properly employed in these conditions will materially shorten the duration of treatment and will produce a more rapid disappearance of the symptoms.

Acute and chronic cystitis are influenced for the better by the use of diathermy, but it must not be forgotten that local and constitutional treatment as well must be utilized if desirable end results are to be expected.

From our experience gained from the study and observation of numerous patients we are of the opinion that diathermy is more valuable in the treatment of lesions of the kidney than in any other part of the urogenital tract. Under conditions of the kidney we naturally do not include those of new growth, nephrolithiasis, congenital or acquired anatomical defects.

*Read at sixth annual meeting, American College of Physical Therapy, Chicago, Nov. 3, 1927.

The conditions which commonly come under the category of Bright's disease, infections, etc., seem to be particularly benefited by diathermy, plus, of course, constitutional and local treatment.

Surgical diathermy is particularly efficacious in the treatment of bladder tumors, consequently will present a rapid resume of the *modus operandi*.

Owing to the more modern and refined methods of examination the diagnosis of bladder tumors is not difficult. Laboratory findings, however, are essential for us to accurately determine the character of vesical new growths.

Bladder tumor occurs quite frequently and forms about 4 per cent of diseases of the urogenital organs. Men are more commonly affected than women, usually affecting individuals between 30 and 60 years of age.

There are no exact and accurate facts regarding the etiology of vesical neoplasms. It seems to be the consensus of opinion, however, that tumor attacks tissue that has been more or less under prolonged irritation, so it is in bladder tumors. In the vast majority of cases if the history of the patient is searched carefully one will find that there has been more or less constantly present symptoms depicting vesical disturbance.

New growths may be classified as follows:

I. Epithelial Types—
  1. Benign:
    (a) Papilloma.
    (b) Adenoma.
    (c) Cholesteatoma.
  2. Malignant:
    (a) Papillomatous, villous and nodular growths.
    (b) Epithelioma.
    (c) Adeno—carcinoma.

II. Connective Tissue Types—
  1. Benign:
    (a) Fibroma.
    (b) Myoma.
    (c) Angioma.
  2. Malignant:
    (a) Sarcoma—various types.

With the exception of papillomata and carcinomata all the forms of vesical neoplasms are of such a rare occurrence that they need not be considered. Although there seems to be a distinct line of demarkation between the non-malignant and malignant varieties yet from a clinical experience covering many years we believe that all types of bladder tumors should be considered potentially malignant and that the classification should be one of degree rather than type, therefore, with this idea in view the treatment together with the prognosis depends entirely upon early diagnosis.

Papillomata may take origin from any portion of the bladder mucosa, but the region of the bladder in or about the area of the orifices of the ureters seems to be more frequently the site of their development than elsewhere. These types of tumors develop in such a manner as to spread out over the surface of the bladder or may arise from a single distinct offshoot. The former are termed sessile, the latter pedunculated tumors.

The symptoms of bladder tumor are so well defined that little difficulty is experienced in making an accurate diagnosis. Hematuria is the most constant symptom and occurs at some stage in practically all cases.

Blood in the urine is always a symptom which portrays some grave pathology of the urogenital organs even if it is present in only macroscopic quantities. The examining physician must never be content until he knows conclusively the source and the cause of the hematuria.

Doubtless you will be surprised to learn that the vast majority of cases examined at the Bremerman Urological Clinic in which vesical neoplasm is diagnosed are late cases, many of which give a history of hematuria which has been noted over a period of years, and in many of the patients the first bleeding dates back to five years or more: naturally enough the cases that come under our observation are well advanced, making the prognosis exceedingly unfavorable. If the patient had been fortunate to have had a thorough and complete examination at the time of the first hematuria unquestionably the growth would have been small and if malignant, of a very low grade, while treat-

ment necessarily would be followed with much better results.

Repetition adds emphasis; remember, therefore, *that blood in the urine is a definite danger signal* and the physician should not be satisfied with merely a tentative diagnosis or palliative empirical treatment.

Hematuria may be the only symptom of bladder tumor; it appears suddenly without apparent ascertainable cause, may continue for one or two micturitions or over a period of a few days and may suddenly cease. Usually the blood is well mixed with the urine. Rest in bed has little if any effect on the hemorrhage.

Whenever I have the opportunity of addressing a body of medical men I always bring to their attention the advisability of frequent standardized physical examination of all people. In my own practice 55 per cent of my clientele are persons apparently free from disease or abnormalities.

If this practice was carried out universally, early diagnosis in many cases would be the result with such striking improvement in the end results that medical and surgical statistics would necessarily have to be recompiled. It is not difficult to prove the advantageous essentials to your patrons and if put up to them in a logical manner, few but will acquiesce to the suggestion.

Just picture the tremendous benefits which would occur to the patient if a diagnosis could be made prior to the development of macroscopic ic hematuria. In every case undoubtedly a microscopic bleeding precedes that which can be noted by the patient and unquestionably a diagnosis could be made prior to the development of malignant changes. As has already been mentioned, the diagnosis is not difficult. A cystoscopic examination will give conclusive evidence. Treatment of vesical neoplasms depends entirely upon the type, character and progress of the tumor. Proper methods applied as early as possible must be instituted if favorable end results are to be expected.

It has only been relatively a few years that other than radical surgical procedures have been done for the treatment of tumors of the bladder. It has been definitely determined by the profession that radical surgery has not been followed with the best results. In as much as vesical tumors are exceedingly prone to recur, and as such recurrence is not apt to be at the site of the primary growth, but usually outside of the previous operative field, and as recurrences frequently become malignant and as metastatic processes seem to be enhanced, the older operative methods for the most part have been discarded.

In our own experience the removal of the growth by open operation or partial resection of the bladder, the result has been particularly unfavorable. A number of years ago we began the treatment of bladder neoplasms by the use of the high frequency spark. This treatment could be accomplished without producing any trauma to tissue other than that which was pathologic, believing that recurrences are due for the most to the implantation of tumor on tissue that had been devitalized by trauma, the newer treatment had a distinct advantage. It has been proven that the influence of the high frequency spark upon malignant growth has not been followed with any good results, in fact the treatment seems to enhance their progression, but in non-malignant types, a definite destructive action is possible and excellent end results without recurrence can be accomplished. If no results are obtained, then the surgeon can suspect the case to be one of malignancy and other methods of treatment must be planned.

The technic of the use of the high frequency spark or fulguration, as it has been termed, is not ordinarily difficult. The only requirement necessary is sufficient knowledge and dexterity in the use of the operative cystoscope. In the treatment of large tumors, pedunculated in character, we prefer the monopolar or Oudin current. In smaller or sessile growths the bipolar or D'Arsonval current is safer to employ, as the spark is not so penetrating and the danger of traumatizing healthy bladder mucosa is minimized.

The cystoscope is passed, the bladder filled with sterile water, the wire electrode passed and by proper manipulation inserted into the tumor under the direct guidance of the eye. The

current is regulated by the use of the foot switch. The intensity of the spark depends upon the size, substance and character of the growth. The entire procedure can be performed with slight discomfort for the patient, nor will it usually incapacitate him from his ordinary duties. Two or three treatments a week can be done without great disturbance to the bladder or urethra if a reasonable amount of care is practiced. Hemorrhage can be definitely controlled with this method of treatment. The patient will pass the sloughing material per urethra with the urine. The size of the growth is much reduced at the second and subsequent treatments. A proper course of treatment must be utilized to assist in clearing up the infection which so commonly co-exists with the tumor formation.

The patient must be instructed to report frequently for observation over a period of a year or two after the disappearance of the neoplasm, so that by repeated examination one can determine if recurrence has taken place or if there is any evidence of a new development elsewhere within the bladder.

As has been already stated this form of treatment is of no value in the treatment of definite malignancy, other technic must be employed. When we have neoplasms of a clinical malignant character we advise a suprapubic cystotomy with a wide exposure of the bladder, so that the growth can be outlined accurately. Diathermy is now employed, destroying as much of the growth as possible well beyond the apparent line of demarkation between pathologic and healthy tissue and as this method is not sufficient we suggest the use of a fairly large dose of radium applied in the shape of small needles which may be planted well within the base of the growth, these needles are so placed that the desired effect upon the remaining tumor cells is obtained. We usually employ 100 mgs. of radium over a period of twenty-four hours, thus giving the patient 2400 mgs. hours of radium. At the expiration of twenty-four hours the needles can be withdrawn through the supra pubic opening. We have had some excellent results from this type of treatment and our opinion based upon the results from a large number of cases proves that it offers more encouragement than any treatment yet brought forth.

In conclusion, therefore, let us reiterate for emphasis the following points:

1. Hematuria is an all important symptom of grave pathology.

2. The cause and source of hematuria is paramount.

3. Early diagnosis is essential for the best results.

4. Radical operative procedure indicated only rarely.

5. Diathermy applied cystoscopically in selected cases gives best results.

6. Diathermy together with radium offers the best results in malignancies.

From the records of the Bremerman Urological Clinic, Medical and Dental Arts Bldg., 185 North Wabash Ave., Chicago.

INDICATIONS AND LIMITATIONS FOR PHYSICAL THERAPEUTIC METHODS IN OTOLARYNGOLOGY*

WITH SPECIAL REFERENCE TO THE TONSILS AND MALIGNANT AND TUBERCULOUS CONDITIONS OF THE PHARYNX AND LARYNX

A. R. HOLLENDER, M.D.
Professor of Otolaryngology, Chicago Eye, Ear, Nose and Throat College; Attending Otolaryngologist, Lutheran Memorial, American, and Chicago Eye, Ear, Nose and Throat Hospitals.

M. H. COTTLE, M.D.
Attending Otolaryngologist Luther Memorial, Illinois Masonic, and Chicago Eye, Ear, Nose and Throat Hospitals
CHICAGO, ILLINOIS

There is an ever increasing realization that in the basic sciences—physics and chemistry, are to be found the solutions for many of the problems confronting the medical profession. This has led to the prompt recognition of physical therapy as a valuable adjuvant in several of the specialties. Like some of them, otolaryngology embraces within its scope, numerous affections for which the usual treatment has not always given good results, and for which the application of physical energies represents a definite scientific advancement.

Heat, light, and other forms of artificially generated physical forces, properly applied and adequately controlled, are now advantageously utilized for a variety of conditions in ear, nose and throat practice. Laboratory and clinical studies (1) have to a degree served to establish definite indications for their application. On the other hand, carefully controlled results and experience gained in the administration of thousands of physical therapy treatments, have demonstrated the fact that certain limitations also exist.

SOME UNDERLYING PRINCIPLES OF ARTIFICIALLY GENERATED PHYSICAL ENERGIES

Heat and *Radiant Energy*. It is fairly well agreed that all wave lengths of radiation appear to possess some heat properties and the ability to influence chemical reactions. When we think in terms of heat production we associate this phenomenon chiefly with the infra red and red rays. Long infra red rays are available in any quantity desired from any of the commoner sources of heat conductors used in practice for palliation of pain or for retardation of an inflammatory process. The shorter and more penetrating infra red and luminous heat rays are obtainable from carbon or other types of arc lamps and also from incandescent lamps which are practically always able to exert a high and more or less uniform degree of intensity.

Heat may relieve pain by diverting blood from congested parts through the production of a collateral hyperemia, and sometimes, perhaps by accelerating blood movements and so relieving vascular stasis. Or heat may lessen nerve sensibility, the result of inhibition acting through the temperature nerves of the skin. The production of hyperemia by the application of heat to a part raises the local tissue resistance by (1) an increased local nutrition, (2) an increased metabolism, and (3) an increased number of phagocytes in the tissues.

Ultra Violet Rays. The spectrum of sunlight is limited on one end by infra red and on the other by ultra violet rays. The ultra violet rays are obtainable naturally, from the sun, and to some extent by reflection, from other natural sources; artificially, to a greater or lesser extent, from carbon or impregnated arc lamps and from quartz mercury vapor burners. Ultra violet rays are rapidly absorbed by the tissues of a depth less than 1 mm., and produce definite chemical changes. Light or any other form of radiant energy cannot act unless it is absorbed. Rays which pass through a cell have no action on it. Light has a stimulating action upon the skin of the body and affects the differ-

*Read at the Spring Scientific Session of the American College of Physical Therapy at Minneapolis, Minnesota, June 11, 1928.

entiation and development of all parts not exposed to this energy. Bovie has suggested that it is not impossible that the action of light on the blood stream is similar to that of light on a photographic plate. He gives the following analogy. The latent image on a photographic plate is due to photochemical reactions; the final image is due ultimately to development and fixation with chemicals. Light acting on the blood stream produces photochemical reactions, "latent images in the blood stream," ultimately developed by the chemical interactions which occur in connection with the metabolic changes having to do with the differentiation of tissue.

It has been demonstrated, furthermore, that ultra violet radiation such as is normally present in sunlight, tends to stimulate the endogenous growth of cells, accelerates the life cycle and therefore hastens death, whereas the longer wave lengths of light are necessarily of exogenous development and the continuation of growth and repair of waste in the cell.

The bactericidal action of ultra violet radiation is well known. This action is however very superficial. Intense radiation has a destructive action on tissue cells. Ultra violet light has an influence on hemoglobin. It also has an influence in increasing the speed of reaction, both the oxidation of chemical compounds in the presence of oxygen and their reduction in the absence of oxygen. Of the direct effects of light radiation must be mentioned the fact that respiration is influenced; breathing becomes slower and deeper. The production of erythrocytes, blood platelets and leukocytes is influenced.

The curative action of ultra violet radiation in several deficiency diseases such as rickets and tetany must also be mentioned. And in this connection the curative effects in surgical tuberculosis should likewise be recognized.

High Frequency Currents—Diathermy—Diathermy has been variously defined. It is now recognized as the use of an alternating electric current of more or less high voltage and high frequency for the production of heat within the tissues of the body. It has also been put thus: A form of thermo-therapy which utilizes electrical energy for the production of thermal effects in the depths of the tissue. The rise of temperature is proportional to the amount of resistance encountered by the current. Diathermy differs from the D'Arsonval high frequency current in that it is characterized by more sustained oscillations, lower voltage, and relatively higher amperage. The maximum heat generation is nearer the smaller electrode. By estimating the approximate depth of the site to be treated, diathermic effect can be produced by varying the size of the active and indifferent electrodes. When the heating effect of diathermy is carried beyond physiologic limits it is destructive in action. It is then known as surgical diathermy or electrocoagulation. Electrodesiccation is a form of surgical diathermy, but its destructive action is effected by tissue dehydration. Thus diathermy may be both surgical and medical in use.

Diathermy is more especially indicated in the treatment of deep seated affections and may be employed alone or combined with other physical agents such as galvanism, sinusoidalism, or the x ray. The amount of current and the duration of the thermal action varies with the pathological condition. Excessively heavy currents and prolonged applications may lead to fatigue and aggravation of symptoms. The tolerance of the patient should be gradually worked up.

Diathermy influences the heat regulating apparatus of the body. This is however, one of its general effects. Locally, there is relatively deep hyperemic action. As a result of this hyperemia, local metabolism is stimulated and the resorption of inflammatory exudates promoted. There is a marked relaxation of the tissues. Diathermy tends to soften tissue. The sedative and analgesic effect of diathermy is more marked than that of superficial heating agencies.

Galvanism. All our electric light and power is due to current electricity. The terms "direct" and "alternating" may be correlated to medicine as the "galvanic" and "sinusoidal," respectively. The galvanic current may be obtained from the electric light mains or from a galvanic cell, the construction of which is well known to students of physics. For medical purposes, chiefly be-

cause of its simplicity, the galvanic current is utilized from the light mains through a simple apparatus so constructed to reduce the amperage and with a meter to measure accurately the amount of current used for any given application.

Galvanism is employed either for its polar effects or for the ionization of drugs. When employed for the latter it has been termed by different writers cataphoresis, anaphoresis, ionic medication, iontophoresis, et cetera.

The galvanic current is chemical in action. The positive pole is the acid pole, the negative pole, the alkaline. The positive pole produces vaso-constriction, the negative, vaso-dilatation. The positive pole contracts and hardens tissue, the negative relaxes and softens tissue. The former decreases active inflammation, while the latter is irritant in character and tends to increase inflammation.

Friel defines the term "ionization" as that form of treatment which consists in the introduction into the tissues of particles called ions by means of the electric current. It may, however, also imply the exchange of ions which takes place within the tissues as a result of the application of the continuous electric current (the galvanic current.)

Of the various metals which have been used for ionization purposes, zinc is the principal one because of its favorable influence on septic conditions.

GENERAL INDICATIONS FOR PHYSICAL AGENTS IN EAR, NOSE AND THROAT DISEASES

In general it may be said that for acute infections either radiant heat light or infra red energy is the safest and most effective measure. Thus in acute otitis media (2) and in acute nasal accessory sinus disease (3) good results have been obtained from therapy. The circulatory changes are chiefly depended upon to effect a therapeutic result, but early, persistent and systematic employment of radiant heat-light is essential if such changes are to be brought about sufficiently to avoid further complications. The use of radiant energy in no way conflicts with other measures which may be indicated, but is simply an adjuvant. It may however be applied to advantage in some cases independent of other remedial agents.

There is no special contra-indication to diathermy in acute infections unless there is active suppuration without adequate drainage. Some rhinologists employ direct diathermy to acute frontal sinusitis and to acute antritis, simply preceding such applications by shrinkage of the nasal membranes.

Acute infections of the nasal or pharyngeal membranes (4) can be effectively treated by short-wave ultra violet energy, but considerable experience is necessary to properly judge the quality of the lamp burner and thus gauge the distance and duration of treatment. The tolerance of the nasal mucosa to ultra violet light is several times greater than the tolerance of the mucosa of the tonsils, mouth or pharynx, and this fact must be constantly borne in mind.

Subacute and chronic infectious processes respond to heat—diathermy if deeply situated—and by the direct method. In this connection, subacute and chronic frontal sinusitis and antritis (5) are the chief indications. Chronic catarrhal otitis media (6) frequently yields to diathermy, the effect of which can be augmented by negative galvanism. Chronic suppurative otitis media (7) has been treated successfully with metallic ionization, although occasionally diathermy to the affected ear is necessary as an added procedure.

Some of the more beneficial results in otolaryngology have been due to the effects of ultra violet radiations on some general diseases which influence the ear, nose and throat. (8) Hyperesthetic rhinitis, certain types of bronchial asthma and upper respiratory infections which are basically the result of metabolic disturbances have improved favorably under general ultra violet irradiations. The tonic effects in postoperative asthenia are marked and patients return to normalcy in a shorter period of time than usual.

THE TONSIL QUESTION

Since the advent of diathermy for surgical purposes, numerous attempts have been made to rationalize electrocoagulation of tonsils as a

substitute method for surgical tonsillectomy. The different techniques for coagulation and desiccation described in the literature leave one in a quandry as to the procedure of choice. The result has been that a great deal of prejudice now exists against any electrical method which is heralded to replace the accepted surgical tonsil enucleation. In this connection, Clark recently stated: "The prejudice against electrothermic methods is due to the fact that they have been many times ignorantly misapplied. Equipment must be efficient and properly selected, technic must be proper, and to intelligently use these methods requires a precise knowledge of anatomical landmarks and the same surgical judgment that every good operator must have. Capable surgeons sometimes condemn electrotherapy, but in nearly every case it can be proven that technic and not electrotherapy is at fault." Thus experience has established a limitation for a method which in the hands of some surgeons has proved successful in selected cases. Clark's method involves desiccation instead of coagulation.

Dillinger is a strong advocate of tonsil coagulation. In several recent publications (9) he reported his experiences with a technic which he mastered from Georges Cortman of Bordeaux, and with which he claims to obtain very satisfactory results.

Cahall (10) condemns electrocoagulation of tonsils as being a uniformly dangerous and unsuccessful method. He prefers what he terms electrosterilization, a uni-terminal or indirect plan of treating the tonsil by means of a tonsillar electrode which is pressed against the surface of the tonsil and held firm until the patient complains of the degree of heat. Eight to ten applications are made. Cahall states: "It is not the intention in this procedure to fulgurate or sear the tonsil, but to establish within the tonsillar structure as high a degree of internal heat as the patient will tolerate. The tonsil is sterilized, fibrosis is eliminated, swelling and inflammation subside and the patient experiences a grateful improvement in the feeling of the throat following the first treatment. Not only is there no edema produced, but there is an actual shrinkage of the tonsil." The organs are reduced to normal size and recurrent attacks of tonsillitis are terminated. Uniform results have been obtained by Cahall in over 50 patients during the two and one-half years in which this operation has been used.

Within the past few years the radio knife has been suggested and employed by some surgeons for the removal of tonsils. With this technic the tonsils are removed *in toto* by a process similar to blunt dissection, while the "radio frequency knife" effectively controls bleeding and seals lymphatics. This method obviously has many disadvantages. Recently Taylor (11) (of St. Mary's, Ont.) devised a special scissors for tonsil enucleation. This new instrument presents the following features: (1) The blades are about half an inch long, they are set well in advance of the pivotal joint; the shanks of the scissors between the blades and the joint are out of contact with one another; and the blades with the shank portions immediately behind them are curved for tonsil work. (2) With the tips of the blades exactly in contact, the blade edges diverge from one another to form a very narrow V opening backward. (3) Each half of the scissors is insulated from its fellow at the joint by the interposition of bakelite between them; a disc of Bakelite intervenes also between the flat head of the centre-pin and the underlying surface of that half of the scissors; and a tube of Bakelite surrounds the centre-pin.

"Thus, when each side of the scissors is connected at the handles with one or other of the terminals of a high frequency machine, the space between the blade edges constitutes a spark gap, which may be opened or closed by opening and closing the scissors." The technic is similar to that of ordinary tonsil dissection. The use of the snare is dispensed with, since the tonsil is severed, in a bloodless manner, at its base. According to Taylor, not the least of the advantages afforded by this method is the visibility of the structures dealt with, due to the unaccustomed dryness of the operative field.

Still another plan of tonsil removal called coagulation-dissection (12) was suggested a few years ago by the present authors. This involves the use of a special insulated tonsillectome,

modified from the original Beck instrument. The technic for the employment of this insulated instrument does not differ from that originally suggested by Beck, save that the severing of the tonsil is effected by a high frequency current, the snare wire serving as the active electrode. This method should be undertaken only by one thoroughly familiar with the Beck technic. The removal of the tonsils is effected *in toto* bloodlessly at one sitting. Buff (13) has recently reported successful results with a slight modification of this original procedure.

Numerous other reports on some phase of the electrocoagulation of tonsils have appeared in the literature from time to time. The regretable feature of a majority of these reports is that the authors have failed to carry out their experimental work scientifically and draw conclusions which are either premature or based solely on clinical data. From available material and from a thorough investigation and personal experience with practically all techniques suggested, the following conclusions seem warranted:

1. Electrocoagulation for the destruction of tonsils has not been perfected sufficiently to replace surgical tonsillectomy as a routine procedure.

2. Either electrocoagulation or electrodesiccation is of decided advantage for properly selected cases in which for some reason surgery is contra-indicated.

3. Electrocoagulation is the method of choice for secondary operations or for the destruction of tonsil stumps.

4. Coagulation-dissection of tonsils as suggested by the authors is of special value for badly diseased tonsils which are acting as a focus of infection in some systemic disease. It is in this type of case that a total rapid removal is desirable, minimizing the dispersion of local disease by prompt sealing off of blood and lymphatic channels.

5. In our experience the Dillinger technic has many advantages over other methods for the slower step-by-step tonsil destruction by electrocoagulation.

6. Whichever plan is used, the greatest caution is necessary for the selection of cases, the anesthesia, the operation itself and for the end result which must accomplish its original purpose based on a definite indication.

MALIGNANT NEOPLASMS OF THE PHARYNX, LARYNX AND NASAL ACCESSORY SINUSES

Probably a more certain indication for surgical diathermy in otolaryngologic practice is malignancy involving such structures as the tonsil, the larynx and occasionally the accessory sinuses. There can be no argument that electrocoagulation is the treatment of choice for tumors of the tonsil. In our experience several such cases have been handled successfully without recurrence of the new growth. It is of course essential to institute treatment early before metastases have formed.

For malignant growths of the larynx electrocoagulation (14) if employed early enough, should produce favorable results. Novak (15) approaches the mass under the guidance of suspension laryngoscopy. He gives the following indications for this combined technic:

1. When the tumor is located largely above the glottis;

2. When there is no extra-laryngeal lymphatic involvement;

3. In patients most favorably suited to suspension laryngoscopy, i.e. with long, thin necks, thin mouth and tongue, good teeth and normal epiglottis.

The conclusions emphasize that a preliminary tracheotomy is imperative; that diathermy offers many advantages over surgery; that diathermy plus radiation is superior to diathermy or radiation alone.

Malignant growths of the antrum (16) are likewise often successfully destroyed by electrocoagulation. The approach is the all important thing. In this surgery must be resorted to, but all surgical incisions are promptly seared by the coagulating current.

Carcinomatous growths of parts which are easily accessible such as the tongue, the lip, the external ear, the nose or the head afford surgical diathermy a definite indication for its use, and if

the malignancy has not advanced too far, good results are usually obtained.

TUBERCULOSIS OF THE MUCOUS MEMBRANES

Our most instructive lesson regarding the treatment of tuberculosis of the mucous membranes may be obtained from reports of the work being performed at the Finsen Medical Light Institute of Copenhagen. Here Reyn, Sonne and other prominent enthusiasts are continually experimenting with light therapy. The statement in all their writings which is emphatic enough to leave no doubt is the imperative necessity of combining general with local irradiations.

In this country, Mayer (18) of Saranac Lake, stands out prominently for his accomplishments in the field of light therapy for tuberculosis. Mayer has repeatedly stated that the possibilities of affecting laryngeal tuberculosis with artificial light sources are theoretically promising, since it is possible to provoke chemical changes in the tissue, focal reactions (as with tuberculin treatment), hyperemia and even destruction of at least the most superficial of the bacteria.

Strandberg (19) recently gave the results of treating 203 patients with laryngeal tuberculosis, all of whom had had lung tuberculosis also. Of this number, eleven are still under treatment, and ten of them have improved. Seventy-nine have discontinued treatment, some because they felt strong enough to work, others because they were so far on the road to recovery that they could continue treatment at a sanatorium, and others for reasons unknown.

"Of these seventy-nine lapsed cases, improvement had occurred in forty-five, thirteen were unchanged, and nine were worse; in twelve in which death occurred, four had been improved, one unchanged and seven aggravated."

Of a total of 192 patients (after deducting eleven who are still under treatment) 151 are being treated as outpatients and forty-one as inpatients. "Before treatment 184 were hoarse and 22 were aphonious. After treatment 102 had recovered their voice, and 40 were improved, while in 41 the condition remained unchanged. One hundred and thirty exhibited tubercle bacilli in the sputum before treatment; twenty-eight became abacillary, while three exhibited bacilli in the sputum after treatment and not before. One hundred and eight had only intrinsic, 82 had extrinsic also, and two had only extrinsic tuberculosis of the larynx. The larynx was cured in 113 patients, or 55.6 per cent.

"Of the 113 patients who were cured, 71 had pure intrinsic disturbances, 34 both intrinsic and extrinsic, two only extrinsic. From this it may be concluded that in light treatment Sir St. Clair Thomson's postulate regarding the greater danger in extrinsic tuberculosis is correct; namely, that the percentage of cures in patients with this form of tuberculosis is perceptibly lower than in patients with only intrinsic involvement. Before treatment, 110 of the cured patients were hoarse (nine aphonic). After treatment the voice became clear in ninety cases, and in five merely improved. Twenty-five had pain and difficulty in swallowing, which disappeared in all cases."

It may be interesting to quote also Strandberg's contra-indications to the use of light baths. These are: severe forms of heart disease, arteriosclerosis, and nephritis when not of tuberculous origin.

Again it must be emphasized that light therapy is but an adjuvant to other measures. It is indeed not a specific. We should by this time be fully appreciative of such measures as rest, hygiene and diet and evaluate them properly and carefully whenever a patient with tuberculosis comes under our guidance.

CONCLUSIONS

There are so many different aspects to the problems entailed in the scope of this paper that only the most important diseases are considered. This is because the main purpose is to emphasize that even in extreme conditions—cancer and tuberculosis—accomplishments with physical therapeutic methods are improving, and undoubtedly will continue to improve, even more, as time goes on. While the extensive experiences of such able workers as Strandberg, Mayer, and others have benefitted those of us who are endeavoring to perform scientific work

in this field, these experiences combined with our own, should at the same time teach us that physical therapy is not a panacea for any disease, but simply an added force, with more or less definite indications and limitations for its use in otolaryngology.

BIBLIOGRAPHY

1. *Hollender, A. R.*, and *Cottle, M. H.* "Diathermic Studies on the Eye and Ear." Arch Otolaryngol., May, 1926.

2. *Hollender, A. R.*, and *Cottle, M. H.* "Clinical Value of Artificial Light in Otitis Media." Clinical Medicine, Sept., 1925; "Radiant Energy in the Treatment of Otitis Media." Eye, Ear, Nose and Throat Monthly, Feb., 1925.

3. *Hollender, A. R.*, and *Cottle, M. H.* "Recent Advances in the Treatment of Nasal Accessory Sinus Disease." Eye, Ear, Nose and Throat Monthly, March, 1926.

4 and 5. *Hollender, A. R.*, and *Cottle, M. H.* "Nasal Accessory Sinus Disease—A Survey of Available Treatment Methods with Special Reference to Physical Therapy." Illinois Med. Jour., Aug., 1927.

6. *Hollender, A. R.*, and *Cottle, M. H.* "Clinical and Experimental Study with Some Physical Agents in Partial Deafness." Arch. Otolaryngol., April, 1926; and "Newer Physical Aids in the Diagnosis and Treatment of Partial Deafness." Arch. Phys. Therapy, X Ray, Radium, April, 1928.

7. *Friel, A. R.* "Statistics of Results of Zinc Ionization in Chronic Otorrhea in over 600 Cases." Proc. Roy. Soc. Med. (Sect. Otol.), Jan., 1926; *Hollender, A. R.*, and *Cottle, M. H.* "Newer Development in Otolaryngologic Therapy." Jan., 1927.

8. *Hollender, A. R.*, and *Cottle, M. H.* "Effect of Ultra Violet Irradiations on Some General Diseases Influencing the Ear, Nose and Throat. " Chicago Med. Recorder, Feb., 1927.

9. *Dillinger, G. A.* "Technic of Tonsil Electrocoagulation (Diathermy)." Med. Jour. and Rec., May 18, 1927.

10. *Cahill, W. L.* "Electro-sterilization of the Tonsils." Texas S. J. of M., Jan., 1927.

11. *Taylor, W. H.* "Electro-coagulation as An Adjunct in Tonsil Dissections." The Canadian Med. Assn. Jour., 1927, XVII, 211.

12. *Hollender, A. R.*, and *Cottle, M. H.* "Electrocoagulation Snares." Surgery, Gynecology and Obstetrics, Jan., 1927.

13. *Buff, Julian.* "The Use of the D'Arsonval Current in the Removal of Tonsils." The J. of the Med. Assn. of Georgia, Feb., 1928.

14. *Schmieglow, E.* "Diathermy Treatments in Certain Forms of Cancer of the Larynx." Acta Oto-Laryngologica, March, 1927.

15. *Novak, Frank J., Jr.* "The Treatment of Malignant Tumors of the Pharynx and Larynx by Diathermy." Illinois Med. Jour., April, 1922; "Electrocoagulation of Malignant Tumrs under Suspension Laryngoscopy." Acta Oto-Laryngologica, Vol. VII, Fasc., 4.

16. *Stevens, J. Thompson.* "Electrothermic Methods Roentgen Rays and Radium in the Treatment of Malignant Diseases of the Eye, Ear, Nose and Throat." J. of the M. S. of N. J., Feb., 1928.

17. *Schmidt, William H.* "Cancer of the Tongue." J.A.M.A., Oct., 1927.

18. *Mayer, Edgar.* "The Fundamentals and the Clinical Aspects of Light Treatment, with Special Relation to Tuberculosis." J.A.M.A., July 30, 1927.

19. *Strandberg, Ove.* "Heliotherapy and Artificial Light Treatment of Tuberculous Conditions and Particularly Laryngeal Tuberculosis." J.A.M.A., May 19, 1928.

OSTEOMYELITIS*

E. C. DUVAL, M.D.
CHICAGO, ILLINOIS

In treating of the subject of osteomyelitis in this paper it is with the idea to awaken thought in regard to the possibilities of physical therapy as a secondary measure in the treatment of this disease, the primary measure, of course, being surgery and surgical procedure has always been indispensable and always will be. Sequestrae must be removed, abscesses must be drained and necrotic tissue must be cleaned away before any other form of treatment is instituted. It would be folly and a waste of time to do otherwise.

However, after the surgical work is completed, nature then is called upon to do the repair work, very often greatly hindered, as for instance by the destruction of some of the blood supply to the affected part and sometimes the case develops into a chronic condition, something which might not have occurred if some form of treatment had been instituted to help nature to overcome the handicap to which it had been subjected. Physical therapy seems to be the logical agent to assist nature in its efforts of repair and we have at our command certain modalities which are of proven value.

*Read at sixth annual meeting, American College of Physical Therapy, Chicago, Nov. 1, 1927.

While it is not the intention to discuss the surgical features of the treatment of this disease, still it might be said that there are certain things to be considered which may have a definite influence on the length of time required for the treatment of a case.

We know for instance and from experience that it is not always advisable to attempt to remove a piece of bone which will eventually become a sequestrium, before it has become detached from the main fragment, as while attempting to remove the decayed bone, one is apt to injure some of the good tissue making it susceptible to the invasion of the infectious process and the consequent breaking down of good tissue. It would be better in such a case to wait until the piece of bone had actually become detached before attempting its removal. Dead bone is loosened from the living by a process of rarifying osteitis and as soon as it is separated from the living bone, it should be removed by surgical interference. If it is not removed by surgery its absorption or extrusion would be a very slow process and while this process is going on there is a liability to extension of the inflammation with further destruction of the bone.

It is also necessary to determine what is the principal etiological factor in each case—whether the osteomyelitis is present as the result of trauma, infection or whether it is due to some disease, such as syphilis or tuberculosis and the reason is that the success of your subsequent treatment will depend largely upon your knowledge of the etiology of the case.

In regard to physical therapy measures which are deserving of consideration, we may mention the ultra violet ray and diathermy. In all cases of osteomyelitis we find some bacteria which are the cause of the infectious process and those that are usually found are the staphylococcus aureus, the staphylococcus pyogenes, the streptococcus pyogenes and some low grade bacteria which may be present as the result of contamination.

The short ultra violet ray is bacteriacidal in its action. Bacteria, on account of their protein composition, absorb more ultra violet energy than the tissue cell and the time of exposure required for the bacteriacidal action does not materially impair the function of the healthy cells. Every accessible cavity or sinus should be rayed every day for a period of time commencing with a three minute exposure and increasing the time gradually until it has reached a period of ten minutes. Where there are long narrow sinuses, such as we sometimes see present in the infections of long bones, a good method of using the actinic ray is through the medium of quartz rods. These rods are easy of application and cause no pain or discomfort to the patient while they are being applied. A manifestation of the good result accruing from the use of the short ray is the gradual lessening of the exudate from the cavity or sinus.

The metabolic condition of a patient suffering with an osteomyelitis is usually far from being a good one and we find that their blood chemistry tests show variable deficiencies in the physiological salts, particularly calcium and phosphorus. Some tests recently made on a number of cases showed the calcium content to be as low as four and one-half milligrams, practically half of the normal content. In chronic cases the blood pictures show, as a rule, a deficiency of red cells and a decrease of hemoglobin. When such a condition prevails ultra violet radiation by the air cooled lamp is of very material benefit. It increases the number of erythrocytes and the hemoglobin and raises the calcium and phosphorus content.

Care must be exercised, however, in using the ultra violet ray so as to obtain the best results. Haphazard raying of the patient does more harm than good and will have a depressing and fatiguing effect rather than the tonic effect that is being looked for. All patients do not react alike to the ray; light skinned people absorbing more energy than dark skinned people in the same time of exposure. Experience teaches the best way is to begin with a half minute exposure for the first day, increasing it to a minute on the second day and from then on a gradual increase of one-half minute each day until the patient has reached a period of thirty minutes exposure. In the use of this method there is an avoidance of the possibility of burning the patient and too rapid tanning of the skin

and there is a gradual approach to the point of saturation, thereby giving the subject of the treatment a chance to derive all the beneficial effects to the fullest degree. If, during this part of the treatment, the patient complains of fatigue after the exposure, it is possible that he has reached the point of saturation and it is well then to desist from further radiation of this patient for some time. Tests taken before and after the treatment will show a decided difference in the blood picture and in the physiological salts content.

In diathermy we have an agent which is a very material aid. One of the principal reasons for the difficulty in overcoming osteomyelitis is the usual lack of blood supply to the part. If the osteomyelitis is present as the result of trauma, such as most of the cases are that are seen in the industrial field of surgery, there has been undoubtedly a destruction of some of the blood vessels, impairing the supply of blood and drainage of the part and afterward, the necessary surgical intervention may further impair the blood supply, leaving the traumatized parts very susceptible to the successful invasion by the bacteria responsible for the infection that follows. It is a well known fact that small arterial channels are capable of rapid increase in dimensions to compensate for the loss of some of the larger vessels and in diathermy we have the necessary stimulus to effect an increased circulation. By its application the blood and lymph vessels are dilated and the circulation is very much activated, causing an absorption of the inflammatory products and a building up of the tissues. In conjunction with the beneficial effects to circulation, diathermy also has an analgesic effect. It relieves pain, probably through its sedative action on the nerve filaments. It increases metabolism by the opening up of the blood and lymph channels, promotes oxidation and very materially inhibits bacterial growth. Any desired amount of heat can be attained in and around the part to be treated and the electrodes should be so applied that the patient will have a comfortable treatment. Care should be taken not to cause a congestion in the part treated, something that is sometimes brought about by a faulty application of the electrodes. Bandages used to retain the electrodes in situ should not be tightly applied, for fear of causing a constriction of the vessels, thereby eliminating the possibility of attaining the object of the treatment—a good circulation to the part.

It will be noticed, particularly in chronic cases, after a few applications of diathermy that the foul odor that usually emanates from sinuses and ulcers soon disappears. The extravasation into the soft tissues is noticeably reduced and the tissues gradually lose the discoloration which is always attendant in osteomyelitis.

The use of the physical therapy agents referred to here have brought about some very good results in some cases. Each of these help nature in a physiological manner. For instance, in the water-cooled lamp, producing the short ray, there is the bacteriacidal action and in the long ray obtained from the air-cooled lamp we have a metabolic synergist which accelerates elimination, increases hemoglobin, normalizes the blood picture and eases pain through its sedative action. In diathermy we have all the good effects which are produced through increased circulation, the inhibition of bacterial growth and the well known sedative action of heat.

If, during the period of time in which the patient is undergoing treatment, there should be a recurrence of an acute condition, the case should be immediately returned to the service of the surgeon and the irritating influence immediately removed. To continue on with the physical therapy treatment would be a waste of time and only delay the inevitable surgical intervention and materially prolong the time of disability of the patient. The manifestations of an acute recurrence are easily recognized in the increased local temperature, the pain that the patient complains of in and around the part, redness of the skin and sometimes the appearance of a mass underneath the skin. If the technician giving the treatment is not a doctor, he should be advised to watch for any such manifestations. It is not an unusual experience for the doctor treating such cases to see an acute condition suddenly arise in a case that was the day before apparently cured.

The substance of this paper is based on the observation and treatment of twelve cases and while no one would offer such a small number as a criterion or precedent for the establishment of a standard treatment, still there is enough in the facts gleaned from these cases to warrant consideration and investigation of the possibilities of physical therapy as an adjuvant to surgery in the treatment of osteomyelitis.

DISCUSSION

DR. R. W. MCNEALY (Chicago, Ill.): There are a few things that one must bear in mind in the treatment of osteomyelitis. Dr. Duval was careful to bring these out. First you must understand that osteomyelitis is a vary broad term applied rather indefinitely to an enormous amount of pathology related to bones, and you must pick very carefully the type of osteomyelitis and very carefully the case, the individual case that you are to treat. I don't know that we can offer anything in the way of either surgical treatment or physiotherapy in acute osteomyelitis, with the exception of allowing the escape of the rapidly forming seropurulent exudate, but it is in chronic osteomyelitis that we find the greatest field for diversified endeavor, and it is here that heliotherapy has its place, surely.

There are three general types of chronic osteomyelitis—the chronic simple osteomyelitis, that which is the continuation of the acute type; tuberculous osteomyelitis, and syphilitic osteomyelitis. In the simple chronic osteomyelitis you have practically three factors to consider: the general condition of the patient, the local pathological condition and the local mechanical condition. When you treat the general condition, you have, as a rule, an individual who has been very ill for a considerable period of time, whose system has been destroyed in part. He is anemic and his blood-forming organs have been taxed to the utmost. There, I believe, Dr. Duval might have said something about the use of the various types of heliotherapy in the stimulation of the blood-forming organs, the spleen, in improving the anemia, which is always present in these cases of chronic osteomyelitis.

When we come to the local pathological and mechanical conditions, the mechanical is the one that results from the presence of a sequestrum or from some cavity, which cavity, by its conformation, does not empty well. There if you have a cavity it must be by mechanical or surgical means, converted into a shallow saucer-like formation which will be easily drained and will allow the pus and foreign material to escape.

After the mechanical conditions, either the removal of the sequestrum or the converting of a cup shape into a saucer shaped cavity has been done, then you have to bring to bear on the case various aids in physiological repair. Of these you have bactericidal agents, to which Dr. Duval has called your attention, the ultra violet ray, and the hyperemic acids which you can bring to bear on the case. These will serve to form a demarkation line between healthy bone and dead bone.

I might here confess to you that in my short experience there has been almost a revolution in the treatment of chronic osteomyelitis. I well remember when I was an intern in the Cook County Hospital; it was quite common to have one of the attending men sign up a case of chronic osteomyelitis and do a very elaborate operation in the way of a sequestrectomy which was more than a sequestrectomy, which included a large amount of healthy bone. In other words, he chiseled away an enormous part of bone that was affected locally in its extent. There has however been a decided reaction, almost a revolution in that work, so that now surgeons are very cautious about chiseling into chronic osteomyelitis with a hope of reoving the dead bone and leaving the good bone. They have long since learned that if you chisel the dead bone away and contaminate the good bone that the good bone will in time become infected and in turn become dead bone, but that is getting into surgery.

Getting back to the use of the physiotherapy method which will aid in this line of demarkation, that is always of advantage. We come to the other field of osteomyelitis, the tuberculous osteomyelitis, and I believe that many of you are more familiar with this field than I am. We have four years looked to the clinician abroad, like Rollier in his treatment of these cases by heliotherapy, and we have applied some such method very liberally in this country. Even now I believe there are many men who have longe since ceased chiseling and scraping, curetting, tuberculous cavities, but are subjecting them to heliotherapy treatment with excellent results. So that you should feel encouraged to cooperate with the surgical profession and have a very close harmony, because there is an enormous field in this portion of surgery, the treatment of osteomyelitis.

CHAIRMAN WALKE: I couldn't let this opportunity go by without thanking Dr. Duval, who has been my constant friend for a number of years and whose work has inspired me as an industrial surgeon. However, I think I have brought Dr. Duval something this year in the treatment of osteomyelitis, and I refer to cases of the traumatic character, those following compound fractures with infection; some may be syphilitic but not of the tubercular type. Of course when we have a syphilitic condition the patient has syphilis and must be treated along that line. In the treatment of osteomyelitis of the long bones I have introduced a method of using two machines on the patient at one time, using a cuff above and below the lesion and a lateral electrode through the lesion, and using diathermy to the point of tolerance. I say, of course, adequate drainage must be present. It is not necessary, though, to do an extensive curetting of the bone, or even to remove all of the sequestra for the simple reason that the

electric current will do it for you. I have used an ordinary glass urethral electrode from the high frequency current into the sinuses themselves and let it run six or eight minutes, and get heat with its bactericidal and stimulating action. In the cases which I have under observation, there are three of the femur, two of the tibia and one of the radius. These cases have cleared up to quite an extent; in fact, four of them are dismissed as cured; the shortest time was seven weeks and the longest time was twenty-two weeks, and of course I feel very much gratified at the result in the introduction of this particular form of technic, using diathermy to the limit. I don't say that I do not use other measures, for the simple reason that I give calcium lactate and manganese dioxide, which I believe is one of the greatest things for calcium deficiencies for the fixation or placing of calcium, and then use body radiations with my air-cooled light. In other words, we must build up the patient, stimulate his metabolism and get rid of the anemia before we can let the patient help himself. These measures should be borne in mind, but what I wanted to offer was the fact of treating the injury itself by the dual method and by the introduction of the glass electrode rather than the quartz applicator into a wound.

DR. EMILE C. DUVAL (Chicago, Ill.): With reference to the comment of Dr. McNealy on the blood increase conditions, the ultra violet ray is a factor that we cannot overlook. As an instance, I would recite to you the case of a boy fourteen years old who was brought to my office with a blood picture showing 2,700,000 red cells and 6,000 whites. The course of treatment was outlined for this boy; he returned in 60 days after being rayed with the air-cooled lamp, with a gradual increase of half a minute until he had had 30 minutes' exposure. The second blood picture showed an increase from 2,700,000 to 4,960,000, and an increase from 6,000 whites to 10,000 whites. That is a sample of what body radiation will do.

In regard to the administration of some internal medication. As I stated in my paper, I found that a great many of these cases suffering from osteomyelitis had a very low calcium content. We have increased their calcium content by the ultra violet radiation and by the administration of calcium lactate and the manner by which we give it to them is this: We give a OO capsule filled with calcium lactate to be taken one in the morning and one at night, and then to help increase metabolism a little bit we give them an eighth of a grain or a tenth of a grain of thyroid in the middle of the day. We find that treatment quite efficacious in these conditions

The main thought with me was to find some treatment that we might call an aftertreatment or an adjunct to surgery in the management of these cases. Undoubtedly it has been you experience the same as it has been ours that the case of osteomyelitis begins and God knows where it ends under the old method. We have these modalities at our command which are instrumental in bringing into use certain forces, natural forces that nature requires for the repair of such a condition as in osteomyelitis. As Dr. McNealy said, there is no doubt that the surface has only been scratched. In my own experience for the past two years I have only had twelve cases,, but the result has warranted further investigation of the possibilities of physical therapy.

I am sure when you have occasion to treat this type of disease that if you use ultra violet radiation and diathermy, coupled with the knowledge and experience of your surgical and medical measures that you have used heretofore, you will find your results will be very gratifying.

THE STATUS OF PHYSICAL MEASURES IN THE TREATMENT OF ANAL AND RECTAL DISEASES*

CHARLES J. DRUECK, M.D.
CHICAGO, ILLINOIS

As the subject of physical therapy in the treatment of any branch of medicine is not new, let us not be conceited or carried away with any of our new-formed messages. Our primitive forebears used a finger in the anus to stimulate peristalsis for constipation; and many of our new methods are only an elaboration of those early technics.

Andrew Carnegie, once asked which he thought was the most valuable in the manufacture and fabrication of steel, labor, capital, or machinery, said, "Which is the most valuable support of a three-legged stool?" So in my work I attempt to hunt out the most valuable things in physical therapy, in medicine, and in surgery. Therefore, what I have to say will be limited to physical therapy, but do not misunderstand that because I do not mention medical therapeutics or because I do not mention surgery that I do not use them. In other words, I believe that practically every case that comes into my work needs the triad.

*Read at sixth annual meeting, American College of Physical Therapy, Chicago, Nov. 3, 1927.

One of the most interesting, one of the most perplexing, one of the most annoying anal lesions that we have is pruritis. Every writer on the subject gives his dissertation and his absolute sure cure. Whatever we use, even if it be physical therapy, we must remember, above all things, its physical properties and its physiological action upon the tissues. I have found a great deal of benefit with the quartz light treatment in pruritis, but first I use my quartz light treatment for its anesthetic effect, temporary, of course. These people come to you with a most distressing itching, a painful itching, it is not an ordinary pain, but an itching which is causing them lack of sleep. Anything that is sedative locally or generally gives them temporary relief while you are able to ferret out the source of the infection. If we find this infection is lodged in the superficial skin below the level of the sphincter muscle, below the anal canal or only in the anal orifice, then the antiseptic, the antibacteriological action of the lamp will give a curative effect, but in all the time that you are hunting, while you are treating the patient with the quartz lamp, you must be thinking not only of the peri-anal skin, but the deeper recesses within the canal and the rectum.

If your lesion is in ulcerated anal crypts, then the quartz light externally will not reach it, because light therapy only goes barely through the skin. If we use the light within the anal canal, we may stimulate some of that rectal ulceration; we carry our anti-bacteriological properties into the anal, and if we can apply this light near the anal ulcers, we will get a curative effect there. We have to search up within the rectum. If we find our patient suffering with hemorrhoids, if our patient is suffering with fistula, or some other disease which extends beyond the reach of the lamp, it will not cure it.

I treat these things perhaps two minutes the first day, the next day three minutes, keeping the lamp quite a distance away. As soon as we get a tanning effect we have obtained the physiological action upon that skin and we cannot push it deeper than that. In that type of work we are getting a stimulation of the skin. The tanning brings up an added amount of blood to the part. In other words, we rejuvenate the local area by increasing the amount of blood congested into the part. Therefore, don't forget hydrotherapy. These patients obtain a world of good out of a normal or neutral tepid bath; it doesn't have to be antiseptic, particularly, but just a tepid bath.

That brings me to the deeper sources of infection. We get furuncles, we get carbuncles, we get perianal abscesses. I don't mean the abscesses that begin uclerating within the rectum and then finally come out into fistulae, but these abscesses which arise below the level of the sphincter and finally rupture externally.

I had just recently a perirectal abscess which involved the whole perineum. I opened it up widely on each side and could run my fingers anywhere through that perineum, almost. The pathologist showed us Welch's bacilli. Some of my neighbors said the man was as good as gone. He was kept in a normal tepid bath twenty-four hours out of the day, excepting when he was taken out to be given light therapy, and finally he got well. So with my light therapy I carry along hydrotherapy, which isn't, perhaps, the popular thing today. It is a far cry from our old water cure to the hydrotherapy of today.

Before we get into the anal canal we come to a different class of perianal lesions, the epithelioma. When we are treating disease which we suspect to be malignant, we want to keep away from all sources of energy that will stimulate metabolism. If I even suspect epithelioma in a nodule about the anus, I never think of using hot baths or light treatment, or anything of that sort, because those things stimulate the glandular system, they stimulate metastasis. Here we get over to our destructive treatments. I use electrocoagulation in removing the nodules that I even suspect of being cancerous, and then give subsequent treatment with the x ray and radium.

If I cauterize an epithelioma (and this remark applies also to the deeper cancers of which I will speak in a moment), if I use electrocoagulation rather than electrodesiccation because I want to get a slower cooking effect of the tissues beyond, I apply my radium at about the

end of a week, that is before cicatrization has completely occurred.

I believe we can cure these epitheliomas. By a cure I mean we can so dissipate them that they never come back. In the use of radium I always employ a large quantity, and I put that large quantity on a long while; I attempt to produce a toxemia in the first twelve or fifteen hours. A small dose of less than 125 millicuries is useless. The men who are not in the larger cities may find considerable difficulty in getting a large enough amount of radium. My experience with radium has been that whenever we have used a dose too small, whether we used it in too small quantity or too short a time, there has been a shrinking of the neoplasm, a cicatrizing over of the neoplasm, a blanching out of the neoplasm, and I have fooled myself for a few months that the thing was gone, only to find it bubble up again in three to six months. After that, radium is not any good in a second dose. Therefore, whatever destructive effect we are going to get with our radium we must get in one big dose and not come back two or three times.

I usually give my radium two or three weeks of action before I start my x ray. The x ray treatments are then carried on until I am sure, both visually and palpably, that I can neither see nor feel anything of the neoplasm, and we should have a good, dense scar. I emphasize that good, dense scar because it is destructive about the anus, it is painful, but even these scars should never be treated with anything to stimulate the circulation. There was some failure of metabolism that caused the carcinoma, and some irritation, some chronic irritation or repeated or persistent irritation which we should obviate.

That brings me to just one surgical point I want to make here. I never treat a known case, a recognized case, of malignancy of the anus or rectum without first doing a colostomy. If my patient won't submit to a colostomy, I let him go some place else. My argument is, as I said a moment ago, that the malignancy was caused by some faulty metabolism, either a toxemia, chronic irritation, or breaking down of the tissue, and the constant, repeated fecal infection is undoubtedly a factor.

Secondly, if we have done a colostomy, if we have finished the work of that anal canal as an exist of fecal matter, we are then more willing, more keen, to carry our x ray and radium treatment sufficiently far at the first to produce a good cicatrization.

I am not going to speak of the matter of hemorrhoids because that is going to be taken up this afternoon. I get a second shot at that when I speak in the discussion.

Fistula. I called your attention a few moments ago to the carrying of our quartz light treatment up within the anal canal. All ulcers within the anal canal are potential seats of subsequent fistulae, so every fistula should be carefully examined (I am not going into the technic of that) for a possible connection with the rectum. If we have a superficial fistula which we can trace underneath the mucosa but above the sphincter muscle, a superficial fistula that ends in an ulceration within the anal crypts or within the anal or rectal wall, such a fistula we may hope to cure with quartz light treatment because our light will go down deep enough for that. If, however, we cannot find the external exit, if upon proctoscopic examination the anal or rectal wall looks perfectly normal, then I hesitate to use quartz light treatment. I don't use any of it for its psychological effect because I am afraid I do more psychology on myself than I do on the patient.

The light will not penetrate deeper than the deep layers of the mucosa, and if the fistula passes outside the sphincter muscle, I then think it needs other than physical therapy treatment. Unfortunately we have not as yet any method of a light probe, like a silver probe, that we can slip through the channel to relieve those conditions. If, however, we do not get apparent result in two weeks' treatment with physical therapy, that treatment should be discarded for fistula. In other words, a recent fistula or a fistula that has not had attention of that sort I treat with light, and I give the patient the benefit of that before I resort to surgery, but I am careful not to carry it on indefinitely.

As we pass up farther we come to our proctitis and our coloproctitis. Here, of course, our quartz light within the rectum will not reach, but in some cases (don't forget the *some* cases) of colitis we do get marvelous results with the abdominal application of quartz light. These patients should be given treatment every day until we get a good tanning effect and then should be equipped with an old-fashioned flannel bandage. You know from the old swimming hole days that as soon as we could get over the blister stage and get a coat on our backs, the thing began to feel easier. That was because we kept the light effect away. With these patients and with the use of light in colitis, the different areas of the abdomen should be mapped out to catch not only all of the large bowel, but the small bowel and the pelvis as well; then following each and every treatment, put the wool bandage on and insist upon the patient's keeping that bandage on twenty-four hours so that there can be no abdominal shock, no thermal shock to the abdomen.

Our strictures within the rectum come within the literature every few weeks, and I have tried all sorts of physical therapy and other means in the treatment of strictures. When the genito-urinary surgeons were touting their success in urethral strictures, I used high frequency and one thing and another within the rectum. I do believe that I am getting some results following surgical dilatation of the rectum with the use of quartz light. Other than that, I am not getting any effect with it. I do use, however, and believe it a wonderful thing to use, the surgical diathermy or the electrocoagulation means of gouging out the rectal wall. The ordinary incising of it simply splits the tissue and does not get rid of the scar tissue, but with electrocoagulation we can excise a large amount of that cicatricial tissue and, as it were, bore out a lumen through the rectal canal again. For that I use the large type of quartz light that I can use for a half minute within the rectum, and then I use it as an ordinary dilator afterward.

Carcinoma within the Rectum. Here I believe both curatively (if I may use that word in a guarded sense) and palliatively in a more liberal sense, I get a great deal of value out of physical therapy. We are told about the rectal cancers that come early. I never see any of them. They are all great big nodular masses when I get them. I always do first a colostomy. I follow that up a little while afterward with my electrocoagulation and cut out the nodular masses that I can see; then I follow along with my radium, a good, big, heavy dose which I use in the rectum, never externally, and then after that my x ray treatment. With that treatment I have seen these tumors melt down, I have seen them almost disappear. Notice I said *almost*, because most of my cancers have been recurrent, most of them locally, although some of them metastasized elsewhere.

DISCUSSION

DR. DAVID WILLMOTH (Louisville, Ky.): I am fully in accord with most of the remarks that the essayist has made. I think if there is anything that we are particularly interested in, as I said last night, it is malignancies. This is part of the work that the essayist spoke of today.

I want to touch on one or two points that he has made. One was the treatment of fistulous tracts. My own experience has been that fistulous tracts are tubercular, that they are nearly 100 per cent so. Some of them, if seen early, following abscesses, you may be able to relieve by physical therapy, I mean by galvanism and the ultra violet light, water cooled. You can inject with carbolfuchsin or gentian violet, which are antiseptics as well, and by that method you can go where you want.

Next is the electrocoagulation of cancers about the rectum. Here again you have a method far superior to the knife, to the cautery, because you can get in with a small needle and electrocoagulate way through, as the essayist told you. In that way you do a bloodless operation, you super-heat the tissues, you can put in larger electrodes if you so desire, and heat the surrounding structures at the same time.

I agree that you should do a colostomy on these people; take the work off the rectum and get it where you can do something for it. You are not going to do much for the patient if you are going to leave the tract open, the pelvic colon open, so the fecal stream can come down over the cancerous mass. Under such conditions you cannot do much with any agent you use.

I am in accord with the essayist on the radium and x rays. Anything should be tried here. I want to take occasion again, though, to condemn the 200,000 volt machines and suggest that you don't use them because of the dangers, which are too great. Use the x ray, certainly, and radium as well. When you do that along with your electracoagulation and take the

work off this cancerous area, you will be able to do something for the patient. The older the patient the more apt you are to relieve the case and let them go along for a number of months or years and die of something else, the reason, as you well know, being that the lymphatic system is practically destroyed in the old patient and you don't have the metastasis to the other parts of he body.

Dr. F. E. English (Saginaw, Mich.): Any irregularities that I may mention you will remember are due to the fact that I am English. I learned a lot of things from the essayist which we will be unable to discuss. He spoke of heat over the abdomen doing much good. It seems to me it will always do good, because if we have a diseased rectal condition the whole alimentary canal is more or less affected first, and treatment all the way along will do good.

The question of itching, pruritis, I learned is always a symptom of something. You will pardon me for citing one case. A man had terrible perineal itching until the integument was two or three times thicker than it ought to be, and entirely scratched off in places; he had had it for several years and had gone to various clinics, he had gone to Ann Arbor, and no one seemed to know what it was. They had examined him for prostatic trouble, too.

He finally came to me. Resting upon the theory that itching is a symptom, I investigated thoroughly. I asked him if he ever had hemorrhoids. He said, "Oh no, I never had anyhing like that." I found a small hemorrhoid on the perineal side of the rectum. I treated that and gave him applications until the itching was overcome, and he recovered very nicely.

There is always a lot of congestion, old prolapsed conditions of the rectum, and pockets that give lots of trouble. That is a symptom of something in there.

I want to mention another case that I didn't get. A fellow I had known for fifteen years, a small man, had a congenital hip trouble. He walked lame. He came to see me with hemorrhoids, which I took care of. Once in a while he came in and said, "I have a lot of aching pain through the lower part of the abdomen."

I said, "Perhaps there is some other trouble there." We kept right on looking after him and finally came to the conclusion that the tight sphincter muscle wall was the trouble. He said somebody had told him to get some dilators at the drug store and he could take care of himself for that. I said, "All right, try it." I didn't see any more of him for about three months. I guess I sent him a bill; that brought him in. He didn't say anything about paying the bill; neither did I. He went to five or six other doctors, and they cystoscoped and found nothing wrong. He went to another who said, " Can you cough? Just open your trousers and cough." He went to a truss maker, had a truss fitted, and is just as fine as can be.

We can increase our powers of observation by training and practice, and we can extend their range by means of special instruments and methods. We can increase our knowledge by study and experience, but can we improve our powers of judgment? I greatly doubt it. Judgment seems to be an inborn faculty, the result of a union of mind and character, which a man either has or has not, and it is almost as difficult to increase it as it is to add a cubit to his stature.—Robert Hutchison, Brit. Med. Jour., March 3, 1928.

EDITORIAL

ARCHIVES OF PHYSICAL THERAPY, X-RAY, RADIUM

Seventh Annual Meeting
October 8-13, 1928
Stevens Hotel,
Chicago

AN INTERPRETATION OF DIATHERMY

Before any abundant and conclusive evidence was presented on the alleged ability of high frequency currents to create a uniform distribution of heat throughout their supposed path in the human body, early investigators, apparently prompted more by superficial appearances than thorough investigation, coined an unfortunate name for the use of such currents—the name diathermy.

Diathermy was a term uncritically ushered into use which was meant to define the "action" of high frequency currents; an action attributed largely, if not entirely, to the hypothesis that such currents in reality do heat through. And ever since the introduction of the definition of diathermy, its many users have sporadically attempted to find out whether or not such currents actually heat through, a sort of cart-before-the-horse science.

About two years ago two investigators published an article in which they reached the conclusion that high frequency currents, judging from their own work, did not produce marked, if any internal heating.[1]

Just recently, still other investigators have published a rather elaborate study on the effect of diathermy in the production of intra-pulmonary heat in pneumonia.[2] By a method of study the probable error of which, incident to the use of a thermo-junction, was not mentioned by the investigators, the conclusion was apparent that in cases where consolidation existed, and conditions were such that the dissipation of heat by pulmonary circulation was minimized because of hepatization, the application of diathermy as is generally described in connection with the treatment of lobar pneumonia by this method, evidenced a rise in the lung tissue of less than one-half degree centigrade . In view of the fact that pneumococcus infection is itself attended by an oral temperature rise of as much, at times, as 4 to 6 degrees Fahrenheit, it seems difficult to ascribe any beneficial action that diathermy may have in such treatment to the obviously slight rise which had to be sought with rather delicate thermo-junctions. Certainly, if a slight rise of one-half a degree in temperature can be effective in the cure of pneumonia, it would seem logical to assume that, inasmuch as practically all cases show several times this increase in temperature because of their own pyrexia, that pneumonia should practically always cure itself by a sort of autogenous "diathermy" treatment.

Clearly, just this form of approach to physical therapy problems has been in no slight measure responsible for the check of scientific progress in this branch of medicine.

But the situation is far from hopeless and despairing. It calls for but a single step—the introduction into physical therapy of the strictly scientific method.

After all, what counts most from the viewpoint of the physician in practice, is not whether high frequency currents heat through or around, but first and foremost, whether high frequency currents, for any reason whatsoever, are as a fact curative in a fair number of pneumonia cases which ordinarily would be thought to be beyond the usually accepted forms of treatment. This is the essence of the very first step in scientific method—the establishment of a fact.

As is well recognized, any statement, to be final in such an issue, must come as the result

of prolonged, intensive and widely applied observation on the part of many clinicians. Such a statistical survey conducted on the effect of diathermy in pneumonia has not yet appeared anywhere. The nearest approach to such a study is the apparent repetition on the part of the competent physical therapy workers of their conviction that pneumonia, more times than would be expected merely if chance were operating, responds to treatment with high frequency currents.

Assuming that pneumonia does respond favorably to treatment with high frequency current, a point which is well worth settling, scientific method does not prescribe that such response need be due to any heating effects of the high frequency currents. From purely theoretical considerations, but in keeping with the teachings of the day in biophysics, reasons can be advanced which throw doubt on the efficacy of the heating value of such currents. The considerations are these: In the last analysis, the heating effect of any energy is a function of the frequency of the energy, providing that the energy belongs to the electro-magnetic spectrum as does high frequency current. There are certain restrictions in this generalization as is apparent by the fact that infra red heats considerably more than an equivalent amount of ultra violet; but these naturally imposed restrictions will serve merely to accentuate the point which it is desired to illustrate.

It has been shown repeatedly by the physicist that energy appears to travel in packets called quanta, as Planck propounded some eighteen years ago. The energy value of these quanta is the product of two factors: (1) a certain natural constant calculated by Planck to be 6.55×10^{-27} ergs per second; (2) the other, the frequency of the electromagnetic radiation. In all cases, the amount of energy carried to a reaction is invariably the product of these two factors. As a consequence of this postulate, it is evident that the shorter wave lengths, which is synonymous with very high frequency, can carry proportionately greater amounts of energy to a reacting system than can long wave lengths, or low frequencies. For this reason, ultra violet should be more energetic than visible light; and this in turn, should be more energetic than infra red. The following brief tabulation makes clear this point:

Wavelength	Frequency	Frequency × 6.55×10^{-27} (Planck's Constant)	Relative Energy Carrying Power
(Ultra Violet)			
λ 2000	15×10^{14}	9.8×10^{-14}	± 9
(Visible)			
λ 6000	5×10^{14}	3.3×10^{-14}	± 3
(Infra Red)			
λ 18000	1.7×10^{14}	1.1×10^{-14}	± 1

Thus, energy at wave length λ 2000 is capable of carrying about nine times more energy into a reaction, the conditions being favorable, than a similar amount of energy at wave length λ 18000. If all of this energy were translated into heat, then the short wave length would impart nine times the heat that is imparted by the longer waves. In reailty, this does not occur. The heating power of short ultra violet rays in the region of λ 2000 is definitely known to be many times less than that of the infra red rays at λ 18000. Obviously, the energy transported must be converted to some form other than heat. It is generally said that short waves are actinic, or chemical in effect, implying that the energy transformation is accompanied mainly by chemical reaction and not by appreciable thermal reaction.

Now, carrying the quantum analysis further, it is interesting to compare the relative energy carrying power of light such as infra red to that theoretically possible with high frequency at a wave length of, say, 300 meters (about that usually supplied in high frequency instruments).

Wavelength	Frequency	Frequency × 6.55×10^{-27} (Planck's Constant)	Relative Energy Carrying Power
λ 18000			
(Infra-red)	1.7×10^{14}	1.1×10^{-14}	± 1
300 meters			
(ave. high frequency)	1.0×10^{6}	6.55×10^{-21}	± 1
			1,500,000

From these values, and providing only that infra red and high frequency currents be supplied at the same intensity, which they are not, infra red waves bring to a reaction over one and a half million times the amount of energy that

is brought by a similar quantity of high frequency current. At first sight, misinterpretation of these somewhat startling theoretical considerations, would lead to the false assumption that a high frequency treatment should heat 1/1,500,000 less than a similar infra red treatment; but the fact is that high frequency currents are supplied in far greater intensities than are infra red waves. By converting these figures to gram calories, the reason for the discrepancy will quickly reveal itself. Thus, by test, an infra red generator delivered at a distance of 23 inches (point of comfortable tolerance) 0.6090 gram calories per square centimeter per minute. An average high frequency treatment, given at 700 milliamperes, with the active electrode measuring approximately 7 × 12 centimeters, and a probable effective voltage of ± 600 volts, gives about 1250 gram calories per square centimeter per minute. It is apparent, then, that a high frequency treatment given as described above, is some two thousand times more intense than a corresponding infra red treatment as described; but, it has already been observed that the energy carrying capacity of the two forms of treatment is 1,500,000 times greater for infra red than for high frequency. If, therefore, the heat generating ability of the two physical agents is distributed alike in both instances, then high frequency currents are approximately 750 times less effective than infra red radiation. It is not proved, nor even perhaps likely, that the distribution of the two forms of energy is the same in the body.

From these considerations, at least two justifiable assumptions are warranted. First, that high frequency currents may not owe such therapeutic benefits as they seem to display in the clinic merely to a heating effect, for if this were true, infra red and perhaps other radiations should be many times more effective in producing the same clinical results. This assumption is apparently tacitly endorsed by the previous work of Bettman and Crohn, who found little or no internal heating effect, and the more recent work of Binger and Christie, who found very slight internal heating effect in the case of pneumonia. It is further interesting to know that D'Arsonval,[3] who introduced high frequency currents to the medical profession some 38 years ago, though fully aware of the heating properties of these currents, defended them, and insists now that in his large experience the therapeutic effects of high frequency currents are not to be sought in the calorific value, but more surely in other manifestations. D'Arsonval has suggested that the probable effects of such currents are known to influence the colloids of the cell. Just as in the case of very short wave lengths, like ultra violet rays, so perhaps in the case of very long wave lengths, represented in part by high frequency currents, the heating property is negligible as compared to far greater chemical and probably other energy transformations.

The second point is no less interesting. It has to do with an effect which, by experiment, is forcing itself more and more on the attention of research workers. The proof seems to be accumulating that radiations of low frequency, when used in very great intensities, intensities far greater than we are ordinarily accustomed to in the clinic, produce physiologic and other responses similar and often identical to those which are known to be produced with radiations of shorter wave length, used at our present day relatively low level of intensity. As a broad indication of the significance of this point, it is seen that comparatively high intensity so-called diathermy currents, produce some heating of the order of that produced with much less intense infra red radiations. This rather important departure has been under investigation in several fields of work for some years, and will undoubtedly find its way into the literature of the very near future.

REFERENCES

1. Bettman, R. B., and Crohn, N. N. *"Diathermy in the Production of Deep Temperature."* Jour. A.M.A., 88:8 (Feb. 19, 1927).

2. Binger, Carl A. L., and Christie. Ronald V. *"Diathermy in Pneumonia."* Jour. A.M.A., Vol. 91, No. 6, 367-371 (August 11, 1927).

3. D'Arsonval. *"Communication to Societe de Biologie."* 1890 and 1891.

LOCAL AND NATIONAL PHYSICAL THERAPY SOCIETIES

There is every reason to believe that there are too many medical societies. The fact is that if one were to attend the various meetings which

are constantly being held, there would not be a sufficient number of days in the week, nor would there be ample time left to work. The time has come, with specialization, that the physician must confine himself to a small group of medical organizations which deal primarily with discussions in which he is most vitally interested.

And this brings us to the objective of this writing. With the progress of physical therapy and its recognition by the medical profession as a legitimate branch of therepeutics, enthusiasts have organized local, sectional and national societies in which the aim is to concentrate on subjects which deal with physical therapeutics. The presumption is that this was forced because the regular medical societies failed to give ample time for the discussion of these newer subjects. Now, of course, few gatherings fail to place on their programs papers of scientific value which deal with such topics as diathermy, galvanism, sinusoidalism, hydrotherapy, medical gymnastics, and the like. There is, however, ample room for a few national societies which deal exclusively with physical therapeutics, and in large communities, a local society cannot help but promote some real good. Let the enthusiast in physical therapy have his forum similar to that of the roentgenologist, the pediatrician or the otolaryngologist. After all who is to define the borderlines of specialties? And are we to criticize the physician who confines himself strictly to physical therapeutics and prefers to be classed as a specialist in such healing, so long as he stays within the bounds of ethics and maintains true scientific standards?

The real purport of this editorial is to overcome some erroneous criticism which has been broadcast concerning an overabundance of physical therapy societies. So far as we are able to determine there are at present too few of them. While physical therapy has been granted "probational recognition," such recognition needs firmer and sounder footing. First class scientific societies in physical therapy have several times demonstrated that their main function was strictly educational. Some of the programs at the annual meetings speak for themselves. So long as this function remains one of learning, the future of physical therapy organizations appears bright. There can be no other ulterior motive, therefore the prospects for the furtherance of progress in this field are now brighter than ever. The matter finally resolves itself into one of understanding.

HIGH LIGHTS OF THE PAST YEAR'S PHYSICAL THERAPY LITERATURE*

Physical therapy has gone forward with such a rush during the past decade that we have scarcely had time to catch our breath and form a sober estimate of the progress which has been made; but now we seem to have mapped out the extent of its field of usefulness with reasonable accuracy and are settling down to intensive rather than extensive study.

Heretofore, the clinical aspects of these new therapeutic agencies have been so spectacular that they have overshadowed everything else; but now we are becoming sufficiently accustomed to the remedial results obtained that they no longer startle us, and the articles which have appeared during the past year have tended to deal more and more with the underlying, scientific reasons for the things we accomplish and with niceties of technic. We seem to be entering upon the *quantitative* phase of our researches.

Examples of the trend of this year's literature are found in the elaborate and highly technical article by Dr. H. W. C. Vines, of Cambridge, England, which appeared in *Endocrinology* for March and April, 1927; in Dr. Herman Goodman's efforts to reclassify ultra violet and other solar radiations on a clinical basis and to rationalize the nomenclature of light therapy, which is in a rather chaotic state (*Clinical Medicine and Surgery*, September, 1927); in the recommendations as to the necessity for establishing the individual "erythema dose" of ultra violet energy for each patient; and in many other similar communications.

The immense possibilities, commercial as well as therapeutic, which inhere in the radiation of foods made a great noise a year or two ago. Now the students are dealing with that subject in more detail and it appears that, in all

*Read at the sixth annual meeting of the American College of Physical Therapy, Chicago, Nov. 4, 1927.

probability, the substances upon which the astonishing results of food irradiation depend are the sterols, notably ergosterol. This line of work is still in its infancy.

Up to the last year or two the mercury-vapor quartz lamp has been used almost exclusively in the United States, for the production of ultra violet rays; but now the carbon arc lamp—long a favorite in Europe—is coming into its own. This apparatus possesses the advantage of emitting rays more nearly comparable to direct sunshine than are those emitted by any other source of light energy. The infra red, visible and ultra violet rays are combined in practically natural proportions, so that deeper penetration is assured and the danger of producing severe erythemas is lessened.

These lamps are now being produced in a wide variety of styles and sizes, adapted for burning plain carbons or those impregnated with various metals or their salts, so that the type of spectrum may be varied to suit the needs of each particular case. They are less delicate, more durable and less expensive than the quartz-mercury lamps, and are giving excellent results.

Several colloid substitutes for glass, capable of transmitting ultra violet rays, were on the market two years ago or more, but, except for certain institutional uses, they proved rather unsatisfactory. The past year has seen the practical development of a clear and permanently transparent glass which will transmit actinic rays in the therapeutic ranges. This opens up a new field in the realm of preventive medicine.

The importance of ultra violet irradiation in the treatment of various skin diseases is a comparatively recent addition to the physical therapist's field of thought and activity, and a number of articles along this line have appeared.

Heat therapy, in the form of medical and surgical diathermy and actinotherapy continue to occupy the most space in the current literature; but radiothermy (including infra red radiations) is exciting more and more interest (see *Clinical Medicine and Surgery.*, September, 1927), and so are galvanism, the sinusoidal currents, static electricity, hydrotherapy, vibration, and other physical agencies.

An interesting indication of the fact that the pendulum of overenthusiasm has reached the top of its swing and is returning to a saner and more reasonable level, is contained in such articles as that of Dr. Albert H. Freiberg in the *Journal of the American Medical Association* for September 3, 1927, and in a recent article by Dr. J. C. Elsom. These sound and thoughtful writers warn us against depending too completely upon machinery. Not all physical therapy is *apparatotherapy;* and we must not forget the powers of *real* massage, passive movements and corrective exercises.

Dr. Freiberg's article also contains an earnest plea that physical therapy be taught in *all* medical schools (not merely in a few of the more forward-looking institutions, as at present) and that facilities be provided for the adequate training of technicians.

More and more writers are realizing and declaring that no physician is competent to administer physical therapy unless he thoroughly understands the fundamental principles which underlie the action of the various agencies, any more than he is qualified to prescribe drugs without an adequate knowledge of pharmacology. They must have this knowledge in order to prescribe treatments or to give them in person.

Moreover, the undue eagerness to treat all cases of tuberculosis with ultra violet radiations, and the tendency to use this agency to the neglect of other remedial measures, is being warned against in a number of articles like the one by Mayer in *Journal of the American Medical Association* for September 10, 1927.

The benefits of physical therapy have, in the past, been confined largely to those patients who could go to hospitals and other institutions to receive such attention; but portable apparatus of all sorts is now being developed so that these forms of treatment can be taken to the bedside, and the literature is reflecting this change in articles dealing with the use of physical agencies by the general practitioner.

The way in which physical therapy is being taken up by the professions coordinate with or subsidiary to medicine is indicated by an article in the *Bulletin of the Chicago Dental Society*

for October 29, 1926, in which ultra violet radiations are recommended for the treatment of ulcerative gingivitis and pyorrhea alveolaris, as well as several other articles in dental journals, one of which recommends the use of these rays, generated by the water-cooled lamp and applied under pressure, in treating acute apical and peridental and chronic abscesses, with and without fistula; and also an article on "Diathermy in Chiropody;" in the *Journal of the National Association of Chiropodists* for August, 1927.

A study of the current medical literature shows the extent to which physical therapy is occupying the attention of students, clinicians and writers. The *Quarterly Cumulative Index*, for 1916, listed 13 articles under the headings "Physiotherapy," "Ultra Violet" and "Diathermy;" while, during 1926, the same publication listed 190 articles on the same three subjects, as well as 47 others on exercise, radiotherapy, hydrotherapy, massage, etc.—a total of 237 articles on physical therapeutic agencies and their uses.

Now that we have the *Quarterly Cumulative Index Medicus* a number of journals are listed which were not so noticed formerly, and the list will probably grow at an even more rapid rate.

In September, 1927, *Clinical Medicine and Surgery*, a journal striving especially to meet the needs of general practitioners, devoted the entire issue to leading articles and abstracts dealing with various phases of physical therapy.

No physician, today, can make the excuse that it is difficult to obtain authentic information regarding the technical or clinical aspects of the use of physical agents in the treatment of disease, for our professional periodicals are full of such material and there is now no lack of reliable textbooks dealing with the use of such agents in medicine, surgery and the various specialties.

George B. Lake, M. D., Chicago.

Managing editor *Clinical Medicine and Surgery*, Attending Internist, American Hospital.

EXAMINATION FOR TECHNICIANS BY THE TECHNICIANS' BUREAU— AMERICAN COLLEGE OF PHYSICAL THERAPY

The Committee of Examiners of the American College of Physical Therapy will conduct an examination for technicians who can meet the requirements, on Friday morning, October 12th, 1928, Hotel Stevens, Chicago. The purpose of this examination is to issue qualifying certificates to those who can meet the educational standards of the college, and who have had a sufficient experience in the technical application of physical agents. Quite a number have already taken this examination during the last college session, and several have already applied for this year's examination. It is rather imperative that all technicians who are desirous of taking this examination during the annual college meeting, make application immediately by writing to:

Technicians' Bureau,
American College of Physical Therapy,
Suite 820, N. Michigan Ave.,
Chicago.

CLINICAL CONGRESS OF PHYSICAL THERAPY

and

AMERICAN COLLEGE OF PHYSICAL THERAPY

October 8 to 13, 1928

Stevens Hotel, Chicago.

PRELIMINARY PROGRAM

INSTRUCTIONAL PROGRAM

Section on
Medicine, Pediatrics, Diagnosis, Neurology and Endocrinology
Monday, October 8th, 1928

Morning Session—South Ball Room
J. C. Elsom, M.D., Acting Chairman

10:00 *Low Voltage Currents* — Physics, Physiologic Action and Practical Uses.
FREDERICK G. MORSE, M.D., Boston

11:00 *High Frequency Currents*—Diathermy Fundamentals, Apparatus, Types, Indications and Clinical Application.
D. KOBAK, M.D., Chicago.

Afternoon Session—South Ball Room
George B. Lake, M.D., Acting Chairman

2:00 *Light Therapy*—(excluding ultra violet). The Spectrum, Modern Views on Light as a Therpeutic Agent, the Thermic Factor, Description of Lamps, Generators, etc., Technic.
J. E. G. WADDINGTON, M.D., Detroit

3:00 *Ultra Violet Energy*—Sources, Mode of Action, Penetration, Results of Researches, Nutritional and Deficiency Diseases.
CARL SONNE, M.D., Copenhagen, Denmark.

4:00 *Clinical Lecture*—"Medical Diathermy."
H. D. HOLMAN, M.D., Mason City Iowa.

Tuesday, October 9th, 1928

Morning Session—South Ball Room

Frank H. Walke, M.D., Acting Chairman

9:00 *Demonstration Clinic*—Low Voltage Currents.
JOHN STANLEY COULTER, M.D., Chicago.

10:00 *Demonstration Clinic*—Light Therapy.
A. E. SCHILLER, M.D., Detroit, Mich.

11:00 *Demonstration Clinic*—Medical Diathermy.
J. E. G. WADDINGTON, M.D., Detroit.

Afternoon Session—South Ball Room

Frederick G. Morse, M.D., Acting Chairman

2:00 *Clinical Lecture*—"Diathermy in Pneumonia."
LOYD M. OTIS, M.D., Celina, Ohio.

3:00 *Clinical Lecture*—"Arthritis."
JAMES C. ELSOM, M.D., Madison, Wis.

4:00 *Clinical Lecture*—"Hypertension."
LUTHER TARBELL, M.D., Battle Creek, Mich.

INSTRUCTIONAL PROGRAM

Section on Surgery, Urology, Obstetrics, Gynecology, Orthopedics

Monday, October 8th, 1928

Morning Session—North Ball Room

A. F. Tyler, M.D., Acting Chairman

9:00 *Diathermy*—Fundamentals, Surgical Indications and Application.
GUSTAV KOLISCHER, M.D., Chicago.

10:00 *Galvanism*—Uses in Surgery, Ionization of Metals and Drugs.
LOUIS H. GRIES, M.D., Chicago.

11:00 *Physical Agents in Gynecology*—Description of Electrodes, Applicators, Technique.
A. D. WILLMOTH, Louisville, Kentucky.

Afternoon Session—North Ball Room

J. U. Giesy, M.D., Acting Chairman

2:00 *Light in Surgery*—
E. C. HENRY, M.D., Omaha, Nebr.

3:00 *Clinical Address*—Bladder Tumors, Treatment by Electrocoagulation.
VINCENT J. O'CONNOR, M.D., Chicago.

4:00 *Clinical Address*—Surgical Diathermy.
ALBERT L. YOCOM, M.D., Chariton, Ia.

Tuesday, October 9th, 1928

Morning Session—North Ball Room

A. D. Willmoth, M.D., Acting Chairman

9:00 *Accessible Malignancies*—
D. KOBAK M.D., Chicago.

10:00 *Industrial Injuries*—
C. M. WESTERMAN, M.D., St. Louis, Mo.

11:00 *Urologic Diseases*—
FRANCIS REDEWILL, M.D., San Francisco, Calif.

Afternoon Session—North Ball Room

D. Kobak, M.D., Acting Chairman

2:00 *Clinical Address*—"The Posture Clinic in Medicine."
K. G. HANSSON, M.D., Westport, Conn.

3:00 *Clinical Address*—Osteomyelitis.
FRANK H. WALKE, Shreveport, La.

4:00 *Clinical Address*—Electrical Tissue Cutting Current.
GUSTAV KOLISCHER, M.D., Chicago.

INSTRUCTIONAL PROGRAM

Section on Eye, Ear, Nose, Throat, Dental and Oral Surgery

Monday, October 8th, 1928

Morning Session—Private Assembly Room No. 2

F. L. Alloway, M.D., Acting Chairman

9:00 *Diathermy*—Principles and Uses in Eye, Ear, Nose and Throat Practice.
M. H. COTTLE, M.D., Chicago.

10:00 *Galvanism*—Physics, Indications, Technic, Physiologic Effects.
A. R. FRIEL, M.D., London, England.

11:00 *Demonstration Clinic*—Electrocoagulation of Tonsils.
GREGG A. DILLINGER, M.D., Pittsburgh, Pa.
PHILIP H. GREELEY, M.D., Portsmouth, N. H.

Afternoon Session—Private Assembly Room No. 2

F. L. Wahrer, M.D., Acting Chairman

2:00 *Ultra Violet Energy*—Local and Systemic Action in Certain Diseases of the Eye, Ear, Nose and Throat.
CARL SONNE, M.D., Copenhagen, Denmark.

3:00 *Light*—Physics, Physiologic Effects of Infra Red Rays, Radiant Heat-light and Ultra Violet Energy.
J. E. G. WADDINGTON, M.D., Detroit, Mich.

4:00 *Clinical Lecture and Demonstration Clinic*—Electrodes, Applicators, Single and Combined Use of Physical Agents, Dosage, Frequency of Treatments, Adjuvants to Medical and Surgical Methods.
A. R. HOLLENDER, M.D., Chicago.

Tuesday, October 9th, 9:00 A. M.

Private Assembly Room No. 2

M. H. Cottle, M.D., Acting Chairman

1. Zinc Ionization in Intumescent Rhinitis.
   JOSEPH GALE, M.D., Chicago.
2. Principles of Zinc Ionization and Its Use in Certain Cases of Chronic Otorrhea. (Illustrated.)
   A. R. FRIEL, M.D., London, England.
3. Radon and Endothermy in Neoplasms of the Upper Air Passages.
   G. ALLEN ROBINSON, M.D., New York City.
4. Value of Intranasal Ultra Violet Irradiations as an Aid in the Therapy of Nasal Accessory Sinus Disease.
   ROBERT G. REAVES, Knoxville, Tenn.

Tuesday, October 9th, 1928, 2:00 P. M.

Private Assembly Room No. 2

T. C. Galloway, M.D., Acting Chairman

Round Table Talks—

I. Light Therapy in Otolaryngology.
   Led by CARL SONNE, M.D., Copenhagen, Denmark.

II. Chronic Otitis Media Suppurativa.
   Led by A. R. FRIEL, M. D., London, Eng.

III. Tonsil Electrocoagulation.
   Led by GREGG A. DILLINGER, M.D., Pittsburgh, Pa.

JOINT MEETING OF ALL SECTIONS

Tuesday Evening, October 9th, 7:30 O'Clock

North Ball Room

Curran Pope, M.D., Acting Chairman

1. Treatment by Zinc Ionization Considered from the Electrical, Chemical and Bacteriological Standpoint.
   ALFRED R. FRIEL, M.D., London, England
2. Heliotherapy in Surgical Tuberculosis.
   CAV. DR. PROF. DONATO DE FRANCESCO., Venice, Italy.
3. The Cancer Problem—Critical Review of Therapeutic Methods.
   GUSTAVUS M. BLECH, M.D., Chicago.
4. Researches on the Effect of the Luminous Rays and Their Mode of Action.
   CARL SONNE, M.D., Copenhagen, Denmark.

GENERAL PROGRAM

SECTION ON

Medicine, Diagnosis, Pediatrics, Neurology and Endocrinology

Wednesday, October 10th, 9:00 A. M.

South Ball Room

Loyd M. Otis, M.D., Acting Chairman

1. Low Tension Currents in General Practice.
   C. M. WESTERMAN, M.D., St. Louis, Mo.
2. Diagnostic Errors as a Cause of Many Poor End Results With Physical Therapy.
   JULIUS BRAMS, M.D., Chicago.
3. Electro Diagnoses in Clinical Neurology.
   THEODORE T. STONE, M.D., Chicago.
4. The Co-ordination of Physical Therapeutics and Endocrinology.
   MAXIMILIAN KERN, M.D., Chicago.
5. Evaluation of Physical Therapy in Dermatology.
   ARTHUR E. SCHILLER, M.D., Detroit.

Afternoon Session—2:00 O'Clock

South Ball Room

E. N. Kime, M.D., Acting Chairman.

6. Ultra Violet Therapy in Pediatrics.
   RALPH KUHNS, M.D., Chicago.
7. The Use and Abuse of Physical Therapy in the Management of Chronic Arthritides.
   WILLARD C. STONER, M.D., and L. S. BROOKHART, M.D., Cleveland, Ohio
8. Physical Measures in the Treatment of Pain.
   R. J. BEHAN, M.D., Pittsburgh, Pa.
9. The Evaluation of Heliotherapy in Tuberculosis.
   SAMUEL H. WATSON, M.D., Tucson, Ariz.
10. Colonic Therapy: Indications, Technic and Results.
    CARLTON. L. ROWELL, M.D., Chicago.
11. Arterial Hypertension and Physical Therapy.
    JACOB GUTMAN, M.D., Brooklyn, N. Y.

Thursday, October 11th, 9:00 A. M.

South Ball Room

A. E. Schiller, M.D., Acting Chairman

12. Physical Therapeutics in Peripheral Neuromuscular Affections.
    EDWIN L. LIBBERT, M.D., Lawrenceburg, Ind.
13. Prescribing Ultra Violet.
    GEORGE B. LAKE, M.D., Chicago.
14. The Effects of Ultra Violet Radiation on the Blood.
    P. H. DORNE, M.D., Chicago.
15. The Effect of the Ultra Violet Rays in Experimental Rickets With Studies on the Lime-Depositing Capacity of the Light.
    CARL SONNE, M.D., Copenhagen, Denmark.
16. The Physiological Action and Therapeutic Value of the General and Local Whirlpool Bath.
    CURRAN POPE, M.D., Louisville, Ky.

Afternoon Session—2:00 O'Clock

South Ball Room

J. M. Torbett, M.D., Acting Chairman

17. The Clinical Significance of Spirograms.
    PAUL ROTH, M.D., Battle Creek, Mich.
18. Physics and Physiologic Effects of Sinusoidal Currents.
    ESTHER T. FRANKEL, M.D., Chicago.

19. Some Interesting Cases With Treatments and Results.
J. W. TORBETT, M.D., Marlin, Texas.
20. Pneumonia or Acute Infections of the Lungs With Medical and Physical Therapy.
HAROLD M. JOHNSON, M.D., Buffalo, N. Y.
21. Mercury Vapor Quartz Light Irradiations Upon the Vascular System.
H. HARRIS PERLMAN, M.D., Philadelphia.

GENERAL PROGRAM

Section on Surgery, Urology, Obstetrics, Gynecology, Orthopedics

Wednesday, October 10th, 9:00 A. M.

North Ball Room

R. T. Pettit, M.D., Acting Chairman

1. Ionic Medication.
FREDERICK H. MORSE, M.D., Boston
2. The Treatment of Gynecological Conditions With the Low Voltage Currents.
FRANK H. WALKE, M.D., Shreveport, La.
3. Electrodiathermy Treatment of Uterine Cervical Lesions.
FRANK M. MIKELS, M.D., Long Beach, Calif.
4. The Effect of Zinc Ionization on Chronic Ulcers. (Illustrated.)
LOUIS GRIES, M.D., Chicago.
5. Ultra Violet Irradiations in Hyperemesis Gravidarum.
H. D. HOLMAN, M.D., Mason City, Iowa.

Afternoon Session—2:00 O'Clock

North Ball Room

Frank M. Mikels, M.D., Acting Chairman

6. Electrosurgery. (Illustrated.)
EDWIN N. KIME, M.D., Indianapolis, Ind.
7. The Use of Diathermy and the "Radio Knife" in Pulmonary Surgery.
RALPH B. BETTMAN, M.D., Chicago.
8. Roentgentherapy of Superficial Neoplasms.
W. E. PENNINGTON, M.D., Indianapolis.
9. New Growths of the Chest Wall, Pleura and Lungs. (Illustrated with lantern slides.)
ALBERT. F. TYLER, M.D., Omaha, Nebr.
10. The Treatment of Pyogenic Infections by the Use of Alternate Hot and Cold Applications.
A. C. SELMON, M.D., Battle Creek, Mich.

Thursday, October 11th, 9:00 A. M.

North Ball Room

F. H. Ewerhardt, M. D., Acting Chairman

11. The Reticulo-Endothelial System in Its Relation to Diathermy.
GUSTAV KOLISCHER, M.D., Chicago.
12. Physiotherapy in the Treatment of Poliomyelitis.
J. ALBERT KEY, M.D., St. Louis, Mo
13. Cancer Growth Arrested by High Frequency Currents. Preliminary Report. (Illustrated.)
FRANCIS H. REDEWILL, M.D., San Francisco, Calif.
14. Diathermy in the Treatment of Prostatitis.
OWSLEY GRANT, M.D., Louisville, Ky.
15. Physical Therapy from the Standpoint of the Industrial Surgeon.
C. R. G. FORRESTER, M.D., Chicago.

Afternoon Session—2:00 O'Clock

North Ball Room

G. M. Blech, M.D., Acting Chairman

16. Important Uses of Diathermy in an Industrial Clinic.
LOUIS FELDMAN, M.D., Boston, Mass.
17. Physical Energies as Adjuvants in the Treatment of Osteomyelitis.
M. B. CIRLIN, M.D., Chicago.
18. The Value of Massage as an Adjuvant to Other Physical Measures. (Illustrated.)
CURRAN POPE, M.D., Louisville, Ky.
19. Physical Therapy as After Treatment in Orthopedic Practice.
F. WALTER CARRUTHERS, M.D., Little Rock Ark.
20. The Cautery Punch Operation.
JOHN R. CAULK, M.D., St. Louis, Mo.

GENERAL PROGRAM

Section on Eye, Ear, Nose, Throat, Dental and Oral Surgery

Wednesday, October 10th, 9:00 A. M.

Private Assembly Room No. 2

Gregg A. Dillinger, M.D., Acting Chairman

5. The Application of Electrotherapy in Otolaryngology.
J. H. Hester, M.D., Louisville, Ky.
6. Radium and Roentgen Rays and Electrothermic Surgery in the Management of Malignant Diseases of the Eye, Ear, Nose and Throat.
J. THOMPSON STEVENS, M.D., Montclair, N. J.
7. The Treatment of Buccal Cancer.
JOHN R. RANSON, M.D., and SANFORD WITHERS, M.D., Denver, Colo.
8. Light Therapy—Its Indications and Method of Application in Otolaryngology.
MAURICE WEISBLUM, M. D. Philadelphia
9. The Scope of Heliotherapy and the Electric Cautery in Laryngeal Tuberculosis.
EDWARD A. LOOPER, M.D., Baltimore, Md.

Afternoon Session—2:00 O'Clock

Private Assembly Room No. 2

F. L. Wahrer, M.D., Acting Chairman

10. Physical Therapy in Glaucoma.
CARL B. SPUTH, M.D., Indianapolis, Ind.
11. Use of Radium in Vernal Conjunctivitis.
I. W. RIGGINS, M.D., Indianapolis, Ind.
12. Diathermy and Sinusoidal Currents in the Treatment of Cataracts and Other Eye Diseases and Conditions.
E. W. COX, M.D., Everett, Wash.
13. Effect of Physical Therapy on the Eye.
F. L. ALLOWAY, M.D., Champaign, Ill.
14. Electrocoagulation in Malignancies About the Head.
T. C. GALLOWAY, M.D., Evanston, Ill.

Thursday, October 11th, 9:00 A. M.

Private Assembly Room No. 2

M. H. Cottle ,M.D., Acting Chairman

SYMPOSIUM ON "THE TONSIL PROBLEM"

15. Further Observations on Electrosterilization of the Tonsils.
W. L. CAHALL, M. D., Atlanta, Ga.
16. Tonsillectomy by Electrocoagulation.
PHILIP H. GREELEY, M.D., Portsmouth, N.H.
17. Electrocoagulation of Tonsils: A Report Based on 500 Cases.
GREGG A. DILLINGER, M.D., Pittsburgh, Pa.
18. Evolutionary Modifications of Tonsillar Electro-Enucleation. (Lantern slide demonstration.)
F. PETER HERMAN, M.D., West Palm Beach, Fla.

Afternoon Session—2:00 O'Clock

Private Assembly Room No. 2

Frank J. Novak, Jr., M.D., Acting Chairman

19. A Practical Scientific Treatment of Oral Conditions by Ultra Violet Radiation.
MAX L. BRAMER, D.D.S., Woodriver, Ill
20. Electrothermic Methods in Dentistry. (Illustrated.)
C. E. NORRIS, D.D.S., Indianapolis, Ind.
21. Value of Ultra Violet Irradiations in Dentistry.
S. WOLLENBERG, D.D.S., Chicago.
22. Chronic Catarrhal Deafness: A Critical Review and Evaluation of Current Methods of Treatment.
A. R. HOLLENDER, M.D., and M. H. COTTLE, M.D., M.D., Chicago.

JOINT MEETING OF ALL SECTIONS

Friday Morning, October 12th, 9:00 O'Clock

North Ball Room

Frank H. Walke, M.D., Chairman

1. The Philosophy of Physical Therapy.
JAMES C. ELSOM, M.D., Madison, Wis.
2. Report on the 1928 International Radiological Congress.
NORMAN E. TITUS, M.D., New York City.
3. Bodily Mechanics.
F. H. EWERHARDT, M.D., St. Louis, Mo.
4. Specifications for a Complete Physical Therapy Department in a Modern Hospital.
SPENCER T. SNEDECOR, M.D., Hackensack, N. J.
5. The Use of Intravenous Lead in the Treatment of Advanced Carcinoma.
ROSWELL T. PETTIT, M.D., Ottawa, Ill.

Afternoon Session—2:00 O'Clock

North Ball Room

Frank H. Walke, Chairman

6. The Effects of Ultra Violet and Selective Solar Irradiations on Growth and Development.
CHARLES SHEARD, Ph.D., Mayo Clinic, Rochester, Minn.
7. The Dangers of Heat Application to the Testicle.
CARL R. MOORE, Ph.D., Uni. of Chicago.
8. The Biological Effect of the Ultra Violet Rays—(with special reference to the question: which part of the spectrum has the maximal effect?)
CARL SONNE, M.D., Copenhagen, Denmark.
9. A Critique of Phototherapy.
FRANK THOMAS WOODBURY, M.D., New York City.
10. The Reaction of the Body to the Short Cold Bath.
W. H. RILEY, M.D., Battle Creek, Mich.
11. The Use of Diathermy and Oxygen in the Treatment of Pneumonia.
L. A. TARBELL, M.D., Battle Creek, Mich.

HOSPITAL CLINICS

Saturday, October 13th, 1928

Medical and Surgical Clinics will be conducted at the following hospitals:

Cook County Hospital.
American Hospital.
Rush Medical College.
Northwestern University Medical School.
Michael Reese Dispensary.
Michael Reese Hospital.
Chicago Eye, Ear, Nose and Throat Hospital.
Ravenswood Hospital.

The Schedule of hours will be announced in the final program.

ANNUAL COLLEGE BANQUET

This is the only official social event of the Clinical Congress and convention. Fellows are urgently requested to be present. Guests of the College and the

ladies are welcome. Some brief after-dinner talks will be given by our European guests, Dr. Carl Sonne of Copenhagen, Dr. Donato de Francesco of Venice, and Dr. A. R. Friel of London. Other guests of the College will include Dr. Maurice Fishbein, Editor, J. A. M. A.; Dr. A. H. Kegel, Commissioner of Health, City of Chicago; Dr. J. H. Hutton, Secretary, Chicago Medical Society, and several other prominent physicians.

The committee aims to make this event an unusually interesting one. It is therefore planning numerous little surprises. The evening undoubtedly will be enjoyable, inasmuch as there will be sufficient entertainment to balance up the serious talks of our guests.

Again, the committee extends an invitation to all who come to the college session, to attend the banquet. PLEASE MAKE YOUR RESERVATION AS EARLY AS POSSIBLE. PER PLATE, $3.00.

TECHNICAL EXHIBITS

Acme International X-Ray Company.
American Journal of Physical Therapy.
Archives of Physical Therapy, X Ray, Radium.
Battle Creek Food Company.
Burdick Corporation.
Frank S. Betz Company.
Britesun, Inc.
Cameron Surgical Company.
Clinical Medicine & Surgery.
Continental Scale Works.
Dr. Holms Vibratone Sales.
Deshell Laboratories.
Ellis Mfg. Company.
The Fair (Surgical Department).
H. G. Fischer & Company.
General X Ray Company.
Hanovia Chemical and Mfg. Co.
Harold Surgical Instrument Co.
Illinois Surgical Instrument Co.
Paul E. Johnson, Inc.
The Kelley-Koett Mfg. Co., Inc.
McIntosh Electrical Corp.
National Carbon Company.
Sanitarium & Hospital Equiqment Co.
Sanborn Company.
Victor X Ray Corporation.
Wappler Electric Co.

OUR EXHIBITORS

The Acme-International X-Ray Company
will display several items of their manufacture in booth No. 47. A visit here will reveal how to avoid the undesirable faradic quality often found in high frequency currents.

The Precision Model IV Diathermy Generator is the latest word in a compact, high voltage, cabinet machine, delivering smooth, non-faradic current of any capacity desired. The Precision Portable embodies the advantages of being truly portable at well as heavy capacity for efficient Diathermy at the bedside of the patient.

A compact 100 K. V. X-Ray Generator will be shown that is very efficient for superficial therapy and diagnostic purposes. You need only to see a chest radiograph taken at 200 M. A. to realize the true value of this unit.

Visitors who desire may visit the downtown factory by arranging with a booth representative.

The Battle Creek Food Company
Battle Creek, Michigan, will exhibit a complete line of the Battle Creek Sanitarium Health Foods.

Miss Ida Jean Kain, Chief Dietitian, will be in charge of the display and will be glad to discuss dietetic problems.

Upon request, you will receive a copy of "Diet Helps for Doctors" a new 48 page booklet which contains Calory, Height and Weight tables; Formulas for Infant Feeding; How to Combat Constipation; The Successful Treatment of Colitis; A Scientific Method of Changing the Intestinal Flora; Diet Lists; Diabetic Ration Tables, etc.

The Battle Creek Food Company will be glad to send you, at your office or home, without obligation, a doctor's sampling kit containing trial sizes of those Battle Creek Sanitarium Health Foods in which you will be interested. Be sure to request yours at the booth.

Britesun, Inc.
will have an unusually complete display of Therapeutic Lamps including the new Britesun Duo-Arc Automatic Lamp, the improved Britesun Twin Arc Lamp, the improved Britesun Single Arc Lamp, the improved Britesun Specialist Carbon Arc Lamp, Britesun Major Radiant and Infra Red Lamp, Britesun Stand and Clamp Infra Red Lamps and the two efficient types of Infra Red Generators.

The Burdick Corporation
Milton, Wisconsin, will exhibit a compltee line of Light Therapy equipment including Air-cooled

and Water-cooled Mercury Vapor Quartz Lamps, Applicators and accessories for use with the Water-cooled Lamp and two new Zoalite models.

They will also exhibit a new item in the line—the Burdick Exerciser.

Items of especial interest will be the new water cell Ever-Clear Quartz window for the Water-cooled Lamp and the new single bar Infrad Red generators for all Zoalite models.

Cameron's Surgical Specialty Co.

Cameron's Electro-Diagnostoset and Electro-Cautery will be demonstrated at the exhibit of Cameron's Surgical Specialty Company, Chicago, space 58. The advantages of Electro-Diagnostic and Operating Equipment that provides Transillumination, Direct Illumination, Accurate Diagnosis, Simplified Technique and Improved Instrumentation for all phases of major and minor diagnostic, operative and therapeutic procedure, will be shown daily during the meeting by trained Diagnostic Clinicians. The complete Cameron's equipment is guaranteed to withstand sterilization by boiling or steam pressure.

Deshell Laboratories, Inc.

At the Petrolagar booth there is an active demand for the set of drawings by Tom Jones, of the University of Illinois, illustrating various types of constipation and bowel conditions. Sets are given free or mailed. They are helpful in consultations with patients and for comparison with roentgenograms. These pictures are distinctive and somewhat different from the usual anatomical drawing of the bowel in that they show the perspective. They are not flat.

The Hanovia Chemical and Manufacturing Co.

who are exhibiting in booths 26 and 27, cordially invite the members of the profession, attending the convention, to visit their booths and see the new features that have been adapted to their standard Quartz Lamp, the Alpine Sun Lamp, the Luxor and the Kromayer.

In the presentation of the Sollux Lamps, the Hanovia Company has reached another goal in therapeutic lamp manufacturing skill. These lamps are the result of patient study and experimentation by a thoroughly equipped research engineering staff. The vital factors necessary for the proper therapeutic results are scientifically involved in their manufacture.

Another important feature of the exhibit is the new Home Model of the Alpine Sun Lamp, a new Ultra Violet Lamp for tonic treatment.

Experienced members of their staff will be on hand, to give what information they have available and a cordial welcome.

Kelley-Koett

The X-ray and Physiotherapy apparatus to be exhibited at the 1928 meeting of the American College of Physical Therapy at Chicago, by the Kelley-Koet Manufacturing Co. represents the very latest in design, construction and operating conveniences.

Advanced engineering in diathermy construction and operating predominates in the new Resogap Diathermy Unit. This unit is characterized by the "Resogap"—a mutually adjusted spark gap induction control and by its ability to satisfy the largest and heaviest technics, yet possessing the necessary sensitiveness of control for the lightest technics used in desiccation or treating small areas.

The Stabilizing Unit is one of the latest developments. It is designed specifically to maintain a steady and constant voltage supply to electrical appliances.

The Portable X Ray Unit, to be exhibited, was designed and built so as to make it a truly high powered portable unit possessing the properties of real diagnostic x-ray apparatus.

The Gang Illuminator establishes new standards due to its accuracy, reliability and versatility in the illumination of a series of x-ray negatives for diagnostic purposes.

Other interesting pieces of equipment will be shown at the meeting.

The McIntosh Electrical Corporation of Chicago

will have on display at Booth No. 38, a full complement of the well-known McIntosh Physical Therapy equipment, prominent amongst which will be the new Hogan Vario-Oscillo-Therm, an entirely new High Frequency ap-

paratus affording infinite control without steps over a range of from 750,000 to 2,200,000 cycles. Several exclusively new features have been embodied in addition, making this the most up-to-date High Frequency unit yet offered the profession. The McIntosh Polysine Generator, the Electra Diathermy apparatus, the new Portable Wall Plate, the McIntosh Model Alpine Sun Lamp, the new Infra Red Generators and the Mercury Vapor Quartz High Frequency Electrodes will also be on display and available for demonstration. A competent staff of demonstrators will be in attendance and visitors to the convention will be made heartily welcome at Booth No. 38.

National Carbon Company, Inc.

will have a most interesting exhibit of its Eveready (National) Sunshine and Therapeutic Carbons. This company has prepared a special demonstration apparatus equipped with accurate measuring instruments to show the different kinds of therapeutic light obtained from the nine types of carbons which are available for physicians' use. The carbons will be shown in actual operation and the demonstration device is so arranged that the several types of arcs can be studied at the same time.

Competent physicists and engineers will be present to explain in detail the value of and usefulness of the various types of carbons. This is the first complete demonstration of therapeutic carbons that has been presented to this association and it offers an excellent opportunity to all attending physicians to become better acquainted with the various carbon arcs which are playing such an important part in light therapy today.

Sanborn Company

at Booth No. 60—Metabolism Demonstrations with the Sanborn Grafic Tester. The grafic automatically measures and records in ink the patient's oxygen consumption during a Metabolism Test. This chart record visibly tells you if the test is Normal, too high (perhaps hyperthyroid) or too low (perhaps hypothyroid).

Latest Grafic models and the simplified Grafic method of Metabolism Testing will be demonstrated by expert Sanborn Technicians. New colors in good-looking enamel finish offer a selection to harmonize with office and hospital furnishings.

Also, the Sanborn Electrocardiograf—This is a very satisfactory apparatus maintaining the principle of the standard Einthoven string galvanometer, but simplified and made practical for routine testing. All working parts of the Sanborn Electrocardiograf, camera, control box, and optical system are of standard size and quality. A 6-volt storage battery supplies all electrical current. You may select from two excellent models—the portable Sanborn Electrocardiograf in three units, or the transportable model, a single unit assembled on a solid oak table with smooth-rolling rubber tired wheels.

The Sanitarium Equipment Company

of Battle Creek, Michigan, will exhibit both mechanical Swedish equipment and light therapy equipment.

The Oscillo-Manipulator, or Health Builder, is a mechanical massaging machine and comes equipped with a wide web belt, a narrow web belt, wooden applicator and hand grips, so that every muscle of the body can be exercised and massaged. It is truly a complete gymnasium in one small, compact machine.

The Vibratory Chair, equipped with a vibrating foot stool and vibrating foot pedals, as well as attachments for vibrating the arms and head and is also furnished with a small, wooden applicator for applying vibration locally to all parts of the body.

There will be three models of ultra violet lamps covering all application of ultra-violet therapy. The Mobile, equipped with automatic feed, with two carbon arcs for full body radiation; the Super Solar, with automatic feed, with a single carbon arc, equipped with applicators suitable for various local applications as well as for general radiations and the R-40 lamp which is hand fed will be exhibited in its very lastest form with larger reflector and designed so as to use local applicators, with a telescoping standard and a greatly improved appearance. The Veelite which is an infra-red lamp will be shown and one of the principal features of this lamp is

that it can be furnished with either carbon filament bulb or infra-red generator. This lamp also has telescoping stand which makes it light and portable.

Victor X Ray Corporation

The exhibit of the Victor X Ray Corporation will consist mostly of Physical Therapy apparatus. This will include their Vario-Frequency Diathermy apparatus, Wantz Multiple Wave Generator, Galvanic Controller, their complete line of Air—and Water-Cooled Ultraviolet Quartz Lamps and a new device for radiant heat therapy, the Victor Thermospectral Lamp, with interchangeable infra-red and incandescent units. It is anticipated that the daily demonstration of the Victor Electrocardiograph will be an outstanding feature, as it has been at other meetings throughout the country.

The trained representatives in charge of the Victor booths will cheerfully assist you in solving your technical problems involving either Physical Therapy or X Ray apparatus. Physicians attending this meeting are cordially invited to take advantage of the opportunity while in Chicago to visit the complete working exhibit of X Ray and Physical Therapy apparatus at the Victor showrooms. Arrangements will be made to conduct visitors thru the Victor factory, where such processes as the construction of the Coolidge Tube should prove most interesting.

Wappler Electric Co., Inc.

The Wappler Electric Company, booths 33, 34, 35, will exhibit their standard high frequency apparatus for medical and surgical diathermy and for endothermy; also the Wappler Myostat Galvanic and Wave Current Generator. They will also show their newly developed Super Excell—an unusually powerful apparatus for medical and surgical diathermy. Two models of their valve tube x ray equipment will also be on display.

INTERNATIONAL SOCIETY OF MEDICAL HYDROLOGY

Annual Meeting in England, Oct. 9-17, 1928.

Provisional Program

Tuesday, October 9. Arrival in London

3-6 p.m.—Registration, distribution of programs, etc., at Great Central Hotel, Marylebone Road.

9:00 p.m.—Conversazione at the Royal Society of Medicine, 1, Wimpole Street, W.1. (Academic dress). Reception by the President-Elect, Lord Dawson of Penn.

Wednesday, October 10. London

10:00 a.m.—First Medical Discussion, at the University of London. "*The Relation between the State, the Health Resort and National Health Insurance.*" Introduced by Drs. Buckley (Great Britain), Hirsch and Etienne (Germany), Durand-Fardel (France), Prof. Gabbi (Italy), Gen. Vicol (Roumania), Drs. Schmidt (Czecho-Slovakia), Kahlmeter (Sweden).

2:30 p.m.—Visits to the House of Commons (arranged by Dr. Graham Little, M.P., for Univ. of London), National Gallery, and other places of interest.

4:30 p.m.—Reception at the Royal College of Physicians by invitation of the President, Sir John Rose Bradford.

Thursday, October 11.

9:00 a.m.—Meeting on "*International Standard Measurements*" (proposals of Council) at Great Central Hotel.

5:00 p. m.—Second Medical Discussion, "*The Humoral Factor in Disease.*" Prof. Sarmento (Portugal), Drs. Poulton, Ferreyrolles, Cawadias, Ray and others.

Friday, October 12.

11:20 a.m.—Depart King's Cross, Arrive Harrogate 3:03 (Lunch on train).

4:30 p.m.—Visit to Royal Baths and Pump Room: Demonstrations.

8:00 p.m.—Dinner given by the Corporation.

Saturday, October 13. Harrogate

9:30 a.m.—Third Medical Discussion: "*The Treatment of Children by Waters and Baths.*" (a) "Salt Spas": Drs. Llopart and A. Keller (Rheinfelden), and Prof. Cattaneo (Salsomaggiore). (b) "Arsenical Waters": Dr. Pierret (La Bourboule). (c) "Carbonic Acid Baths": Prof. Groedel (Nauheim). (d) "Chalybeates and Muds": Dr. Sigmund Wasserman

(Franzensbad). (e) "Hydrotherapy": Prof. Douglas Stanley (Birmingham).

11:15 a.m.—Demonstration of Rheumatic Cases in the hospital.

12:15 p.m.—Inspection of the Royal Bath Hospital. Demonstrations.

2:15 p.m. Motor expedition to Fountains Abbey (by invitation of the Corporation). Tea at Brimham Rocks. Reception by the Harrogate Medical Society.

Sunday, October 14. Harrogate to Buxton

4-5 p.m.—Tea in Buxton Pavilion Gardens (by invitation of the Corporation). Dine at hotel.

8:30 p.m.—Reception by Buxton Medical Society.

Monday, October 15. Buxton.

9:30 a.m.—Visit to Natural Mineral Water Baths, Hot Baths and St. Ann's Well. Demonstration of the Estimation of Radium Emanation, by Joseph Race, F.I.C.

11:00 a.m.—Visit to Devonshire Hospital: demonstration of cases by the Physicians.

11:30 a.m.—Open Meeting of International Committee on Rheumatism. Lunch at hotel.

2:30-4:30 p.m.—Charabanc drive, by invitation of the Corporation. Tea *en route*.

5:30 p.m.—"*Mineral Springs in Mexico.*" Dr. Baudisch (U.S.A.)

7:30 p.m.—Dinner by invitation of the Corporation.

Tuesday, October 16. Droitwich and Bath

8:00 a.m.—By motor to Droitwich.

1:30 p.m.—Reception by the Mayor and Corbett Trustees. Luncheon given by the Corbett Trustees in the Salter's Hall. Demonstrations at the Brine Baths.

4:00 p.m.—Afternoon tea given by the Corbett Trustees. Depart by motor about 4:45 p. m., arriving at Bath about 7:45 p.m. Dine privately at hotels.

9:30 p.m.—Reception by the Mayor and Mayoress of Bath (Alderman Cedric Chivers, J. P., and Madame Sarah Grand) at the Pump Room.

Short Lantern Talk on "The Baths of Bath Through the Ages" by the Spa Director, Mr. John Hatton.

Wednesday, October 17. Bath

8:00-9:30 a.m.—Treatment may be taken at the Bathing Establishment.

9:30 a.m.—Visit Bathing Establishment. Demonstrations of Treatments.

11:00 a.m.-12:15—Visit to Royal Mineral Water Hospital. Demonstrations of cases by the Physicians: Drs. R. Waterhouse, J. Lindsay, Vincent Coates, R. G. Gordon, A. Gordon Watson.

1:15 p.m. Civic Luncheon at the Guildhall, by invitation of the Mayor.

2:45 p.m.—Motor tour of Bath and environs, historic houses, etc. (by invitation of the Baths Committee.)

4:45 p.m. Tea at the Roman Promenade. Visit to Abbey (if time permits).

6:21—Return to London (dinner on train, if required), arriving at Paddington at 8:45 p.m.

THE STUDENT'S LIBRARY

BOOKS RECEIVED

This column is devoted to acknowledgment of the books received. Such acknowledgment must be regarded by the sender as sufficient recognition of the courtesy until time and space permit selections to be made for review.

DIATHERMY—ITS PRODUCTION AND USES IN MEDICINE AND SURGERY. By *Elkin P. Cumberbatch,* M.A., B.M., (Oxon.), D.M.R.E. (Camb.) M. R.C.P. Medical Officer in Charge of Electrical Dept., St. Bartholomew Hosp., etc. 2nd Edition. Cloth. $7.00. Pp. 332 with 87 illustrations C. V. Mosby Co.

GOITER PREVENTION AND THYROID PROTECTION. *Israel Bram,* M.D., Formerly Instructor in Clinical Medicine, Jeff Med. Coll., Philadelphia. Cloth. Pp. 327. F. A. Davis Co., Philadelphia, Publishers.

A MANUAL OF RADIOACTIVITY by *George Hevesy,* Ph.D., Copenhagen and *Fritz Paneth,* Ph.D., Berlin. Translated by *Robert W. Lawson,* D.Sc., F. Inst. P. 252 Pp. Oxford University Press, Publishers, New York City.

BOOKS REVIEWED

DIE PRAXIS DER PHYSIKALASCHEN THERAPIE. *von Dr. A. Laqueur,* Dirigierenrem Arzt Der Rudolph Virchow Krankenhause, etc. Paper. Price 18 marks. Pp. 357, with 98 illustrations. Third Edition. Berlin, Julius Springer, Publisher, 1926.

This book, intended for both the student and general practitioner is an exposition of the principles of Physical Therapy, its theories and clinical application. The author has materially enlarged this edition and has stressed diathermy and phototherapy, not however, to the exclusion nor the minimization of hydrotherapy, the low frequency currents, and massage. Radiant light therapy and the various instruments utilized in phototherapy is discussed in a concise and authoritative manner. The therapeutic value of the various carbon arcs, mercury quartz lamps and sun therapy, and the usefulness of each, as well as their limitations, is indicated. The evaluation of the different sources of artificial light is a welcome contribution and bears out the contention that, within proper limits and intelligent application, all have definite fields of usefulness. The author discusses high frequency currents with a brevity that is altogether too pronounced for the importance of the subject. He has, however, managed to include in the space of this edition a clear exposition of the physical principles, mechanical structure, and the physiologic effects of this agency. This chapter is full of meat without the redundancy of padding. Because of its important position in physical therapy it would have added to the value of this book to have discussed the usefulness of diathermy and its limitation with greater detail. Surgical diathermy is also given less space than is warranted by its importance. There is a suspicion that its abbreviation is either due to a lack of appreciation of its usefulness in certain indicated conditions, or that its iiclusion was merely an afterthought.

The section on hydrotherapy is unusually well written. All the classical procedures are included, and one can select from its pages valuable suggestions for office or institutional practice. It may well be considered a reliable epitome on the subject.

The clinical section is devoted to a discussion of the various methods of application and to the blending of different physical measures to indicated conditions. The author not only gives freely from his large experience but frequently adds convincing reference to substantiate his argument. The limitations of the various agencies are fully appreciated by the author as he neither considers them specific in all conditions nor does he advise their use to the seclusion of proven orthodox measures. This book bears the stamp of wide experience, and is deserving of a wider reading clientele.

PRACTIKUM DER HOCHFREQUENZTHERAPIE (DIATHERMY) MIT EINEM ANHANG PHOTOTHERAPEUTISCHE METHODIK — IN SECHS VORTRAGEN. *Von Dr. Hans Leo Stiebock,* Polikl. Assistent, Leiter Der Station fur Strahlentherapie An Der Wiener Allg. Poliklnik. II Med Abeilung (vorstand: *Dr. A. Strasser.*) Vienna, Verlag von Julius Springer, 1926.

This small volume is a collection of six lectures on Diathermy and Phototherapy. The author has attempted to incorporate the facts and theories of the foregoing divisions of physical therapy into the limited space of the book, and has succeeded only in skimming the surface. As is to be expected, it neither carries conviction to the beginner nor is satisfying to the specialist. The author has attempted to incorporate within the space of 38 pages a history of the development of high frequency currents, its laws and physics, construction of apparatus, technic of electrode application, its physiologic effects, indications and contra-indications both medically and surgically. The sixth lecture is devoted to phototherapy and its uses. As a book it is a well conceived outline and as an outline it is of insufficient authority to rank higher than a short but well intended survey of the subject.

INTERNATIONAL ABSTRACTS

Irradiated Ergosterol as a Wound Dressing. C. J. Bond. Brit. M. J., March 3, 1928. Abst. J.A.M.A., April 28, 1928.

Bond relates his experience with irradiated ergosterol, dissolved to the saturation point (about 3.5 per cent) in liquid petrolatum, as a dressing for ulcers and granulating wounds. It is said to reduce infection and promote healthy granulations, and to stimulate the ingrowth of epithelial cells from the margin, thus favoring the healing process. Bond suggests that the beneficial effect of irradiated ergosterol, when used in solution in liquid petrolatum as a dressing for wounds, may be due to a further continued irradiation effect on the wound tissues after the primary irradiation of the sterol by the ultraviolet rays from the mercury vapor lamp has ceased. Experiments carried out by Bond suggest the conclusion, either that ergosterol when treated by ultra violet irradiation takes up oxygen which can be subsequently liberated and is itself vitamin D, or that two substances are formed from the sterol during irradiation—one a vitamin, which does not take up and subsequently liberate oxygen, and the other a substance of a peroxide character, which does take up oxygen and gives the starch potassium iodide color reaction and which hemolyzes the red cells. If two substances are formed, the further question arises which of these substances exercises the stimulating and healing effect on wounds. The fact that the activated substance which forms during irradiation is a fat-soluble material is of considerable importance; for, unlike a water-soluble material, a fat-soluble substance can transmit oxygen through the lipoid coatings of the cell and its nucleus, and if it is also an oxygen carrier, soluble in fats, it may exert its influence on red cells, leukocytes and tissue cells.

Adjuvant Action of Diathermy in Nasal Accessory Sinus Disease. Charles R. Brooke, M. D. Phys. Therapeutics, April, 1928.

The conclusions of Brooke are:

1. Experience shows the early use of diathermy to prove that sinus disease can be eradicated before the involved structures are irreparably damaged.

2. The use of diathermy in sinus infection has shown a degree of recovery resulting that frequently surpasses all expectation.

3. Diathermy with other physical measures combined or singly applied in sinus disease, has, to some extent, replaced the older measures of treatment.

4. Many cases have shown that a prompt adequate relief can be obtained by the use of diathermy in otherwise seemingly incurable sinus conditions, and this has brought about much appreciation from patients who have availed themselves of this effective form of treatment.

Ultra Violet Radiated Milk as an Antirachitic. Dr. Karl Gillern and Dr. Viktor Hussa. Wiener Med. Wochenschr., Vol. 77, No. 50.

The authors did not go out with the intention of proving that milk after subjection to ultra violet radiation has antirachitic properties, because this had already been established beyond any doubt by Hess of New York, H. Steenbock and especially Gyorgy of Heidelberg. The trouble was to prove that chemically or roentgenologically not that the P. and Ca. content of the blood was raised nor that calcium deposits were increased, but to find ways and means to avoid the disagreeable taste of the milk, resulting from the radiation. The pediatric university clinic of Heidelberg expressed itself in full praise about radiated milk, but admitted that only a few children will be found who can take it, as the taste is similar to that of rancid oil.

An Austrian milk concern devised an apparatus provided with an interrupted wire cage cylinder, over which the milk is allowed to run freely while undergoing intense radiation.

The experiments were undertaken for the purpose of testing the effectiveness of this apparatus, the radiated milk from which underwent no change in taste.

Sixty-five albino rats were utilized. Forty-five rats divided in nine groups of five, received the following rickets-producing food, while being kept away from direct sunshine:—

33 parts ground wheat
33 parts ground maize
15 parts gelatine
15 parts wheat paste
3 parts calcium carbonate, c.p.
1 part sodium chlorid, c.p.

The gelatine was dissolved in hot, distilled water, and in this was stirred the food mixture, which was given when cooled.

The other animals were given normal food of lard, bread and water, for purpose of control.

The majority of the forty-five experimental rats developed undoubted phenomena of rachitis.

Of these same animals two were rayed directly after they had been near death. One was saved. The remaining rats were fed with milk provided by the dairy and recovery was demonstrated clinically and by x ray plates.

The authors confirm, therefore, the effectiveness of the apparatus and recommend its general introduction for prophylactic purposes, which can be guaranteed to be effective in view of the prompt therapeutic results in established rickets.

Heliotherapy in the High Mountains. A. Rollier, Strahlenther., 28, 2, 1928.

Heliotherapy in the high mountains offers intensive equal exposure to the sun's rays with very few interruptions. The amount of cooling in wind protected, sunny, high mountains is small even in the winter months. The lessened atmospheric pressure determines an increased minute volume. The high climate determines stimulating, antitoxic, antipyretic effects. Heliotherapy produces excellent results in tuberculosis, incipient tuberculosis, skin diseases, various nerve affections, rickets, anemia, etc.

Light Therapy in Pulmonary and Laryngeal Tuberculosis. O. Ziegler, Strahlenther., 28, 2, 1928.

The specific effects of light rays on the course of pulmonary tuberculosis has not been proved. Light rays affect the general condition, stimulate the powers of resistance, but are, however, a strong irritation method, the indiscriminate use of which, should be warned against. Irradiation acting directly or generally, has a specific, favorable effect on laryngeal tuberculosis. The direct irradiation of quartz light, sunlight, and carbon arc light prepares the patient for a rapid recovery.

Radioactivity. Hougardy, Liege Med., 21, 4, 1928.

Among the heavy radioactive substances, K, is of particular interest, since it is the only one of the 12 biogenic elements that possesses radioactive properties. It emits only beta rays. Swaardemaker attemped in numerous experiments to determine the relations between the biological role of K. and its radioactivity. His general conception of bioradioactivity was attacked by Hamburger, Clark, Librecht and Loeb. After a comprehensive critical evaluation of the opinions, pro and con, the author comes to the conclusion that the facts on which the former hypothesis rests have not as yet been seriously shaken. The qualitative and quantitative substitution of K by one of the well known radioactive substances, the antagonism between Ca and the radioactive elements, which is completely parallel to that of Ca and K., the effect of the sensitizing substances, the phenomenon of distance irradiation, the ionization of gases in the presence of the ash of an organ perfused with a radioactive solution, all of this can be convincingly demonstrated. Even if the premises cannot be maintained in all details, this hypothesis is nevertheless best adapted to the present state of our knowledge.

On the Effect of Roentgen Rays on Living Tissue in Vitro. R. Gassul, Strahlenther., 27, Heft 3.

Roentgen rays in biologically effective doses cause regressive protoplasmic and nuclear changes. With unfiltered rays, there is a phase in which only protoplasmic changes are visible. The nuclear migration of erythrocytes, indicates osmotic protoplasmic changes. The difference in carmen staining after filtered and unfiltered rays may be ascribed to a difference in injury of the cell membrane by soft and hard rays. An increased vital staining power may be ascribed to a membrane injury resulting in a greater permeability for a given dye. In this respect the younger cells seem to be more resistent than the older reticulo-endothelial cells, which sooner increase their stainability over the normal, after roentgen irradiation. Lymphocytes and leucocytes were quickly destroyed by the irradiation.

The Photo-electric Effect of the Skin in Sun Baths. W. Kartschagin, Zschr. F. Die Ges. Physikal Ther., 24, 5, 1928.

The photoelectric effect is the phenomenon of the loss of electrons which certain bodies show upon the absorption of light energy. This effect was discovered by Hertz and Hallwachs. Previously neutral bodies become positively charged by the irradiation. The irradiation causes an increase in the charge in previously positively charged bodies, and a decrease in the charge in previously negatively charged bodies. The authors describe a method whereby the photoelectric reaction can be demonstrated on the surface of the human body. Under the effect of the energy of the rays which penetrate the skin at least 0.5 mm., a certain number of electrons leave the organism. This number amounts to about a fifth of the negative charge which the charged body loses normally through the ionization of the air.

Spectroscopic Investigations of Porphyrins, Porphyratinsand Muscle Dye Substances. O. Schumm, Strahlenther. 28, 1, 1928.

The slight amounts of hematoporphyrin present in normal urine is koproporphyrin. There are also traces of uroporphyrin. The koproporphyrin content is dependent on the diet. In severe cases of lead disease the amount of korproporphyrin is increased in the urine. In severe cases of hematoporphyry, a light poisoncus porphyrin circulates throughout the tissues. Abnormal formations of uroporphyrin should not belong to the manifestations of light disease. Porphyratins are complex combinations of porphyrins and metals (catalytic effect of iron porphyratins). Considerable amounts of koproporphyrin could not be demonstrated in muscle. There is as yet no experimental proof for the assumption of the presence of a blood dye stuff B. (Hans Fischer).

The Failures of Roentgen Therapy in Hypophyseal Tumors. J. Bourguet, Ann. D'Oculist, 89, 8, 1927.

In his 13 operations on hypophyseal tumors, the author tried roentgen therapy before operation in 9 patients with only transitory success or none at all. Cushing in his 258 operations saw only exceptionally a symptomatic improvement after roentgen irradiation, never a real cure. Adson (80 operations) tried it with weak and strong roentgen doses and as a result has much more confidence in surgical treatment. Frazier (102 operations) considers the percentage of favorable roentgen results as very small, and Hirsch (more than 100 operations) does not believe in favorable results with roentgen therapy. There is only one, Beclere, who considers roentgen therapy the best treatment of hypophyseal tumors. The author gives the procedure used by Beclere. His own surgical approach through the nose, without external incision, under local anesthesia, gave one fatality, not due to the technic. Cushing had 4 fatalities in his last 105 operations, Frazier 3% and Hirsch no mortality in his last 25 patients. All these authors could prevent complete blindness in about 70% of the patients and were able to cause considerable improvement in the rest.

The General Effects of Light. W. Hausmann, Strahlenther., 28, 1, 1928.

It has been demonstrated that over-sensitiveness to light is more frequent in the invisible than in the visible spectrum. With the assumption that the porphyrins cause the oversensitivity to light towards ultra violet in the hydroa, the presence of desensitisation in the visible spectrum must also be assumed at the same time. Desensitisation is probably at the basis of processes which bring about a tolerance to light. It is possible to obtain similar effects of various biological rays and different kinds of rays may mutually affect each other. Hess has shown that the effect of visible rays can increase the healing effect of ultra violet rays in rickets.

The X Ray Treatment of Amenorrhea with a Report of Thirty-Eight Cases. Ira I. Kaplan, M.D., Amer. Jour. Obs. and Gyn., Vol. XV, May, 1928, Page 658.

Kaplan shows that amenorrhea and sterility can be treated with the x ray. Of thirty-eight cases treated, thirty responded favorably with menstruation and eleven subsequently became pregnant. No abnormal children were born in his series of radiated cases, which permits Kaplan to conclude that when properly treated no harm ensues to patient or offspring. The technic used was as follows: In all cases, high voltage x rays, Kv. 4—MA., 0.5 copper, one aluminum filter, 23-30 cm. distance, 6x8 and 9x12 portals. The treatment was given over the right and left anterior posterior ovarian areas, with alternate dosage one week apart. The total dosage on the ovaries varied between 10—15 per cent of skin erythema dose.

X Ray Treatment of Basedow's Disease. Paul Krause, Strahlentherapie, Vol. 27, No. 3.

The author considers radiotherapy particularly indicated in the acute form of Basedow's disease. Patients who have lost weight and suffer from tachycardia and nervous symptoms are especially suitable. Indeed, in such cases this is the method of choice, as operation is fraught with danger. But even in the affections with a slow course radiotherapy is preferable to surgery if there exists heart insufficiency. Krause gives full directions for the dosage to be used, and the restriction of the fields to be subjected to radiation. The metabolic rate readings are safe guides to register the affectiveness of the treatment, so that any damage, especially the much dreaded myxedema can be prevented with certainty.

Gustavus M. Blech, M.D.

Prevention of Burns by Diathermy. Kowarschik, Die Aerztliche Praxix, No. 2, 1928.

Burns produced by diathermy can be prevented if one takes proper care to master the technic. As a rule burns are due to unforseen accidents. The separation of the cord from the electrode frequently results in a third degree burn. Likewise lifting up the electrode while the current is on produces a severe burn. If a cord should be so defective as to break, and the broken end touch the patient, burns of various degrees may result. Kowarschik thinks that burns due to too strong currents or improper adjustment of electrodes are comparatively rare. The patient's sensibility to heat should be tested out (injuries to nerves, neuritis, lomocoter ataxia, hysteria, etc.) and in cases of this character special care should be exercised in the application of the electrode and the dosage of the current. Diathermy burns differ from the usual ones in two characteristic ways: (1) by their insignificant or total absence of pain, and (2) by the long duration of healing. A special burn observed only in diathermy is that of the subcutaneous tissue, which is purely an over-heating in the subcutaneous fat, leading to necrosis, without the skin being injured in the least. Such burns are usually recognized as heat infiltrations which are scarcely painful spontaneously but painful on pressure. These infiltrations are fairly difficult to feel and disappear in the course of a few weeks without any trace.

Gustavus M. Blech, M.D.

On the Analytical Value of Filtered Ultra Violet (so called Wood) Rays for Criminal Law, Biology and Medicine. R. Gassul, Deutsche Med. Wschr. No. 22, June 1, 1928.

These so-called Wood rays (or still better, Wood light) are not a new kind of rays, but are a special subdivision of filtered ultra violet spectrum from a wave length of 3700 A. to 2700 A. Wood in the year 1903 was the first to obtain a pure bundle of ultra violet rays without the admixture of the visible part of the spectrum of the source of the rays. He accomplished

this by means of a special liquid filter which consisted of salt solutions of Nitrosodimethylanilin substances in quartz cubes. Wood found, when these rays fell on an object, that it began to glow with a color and nuance characteristic for the object. Wood's apparatus was very expensive and therefore could not have a very wide application.

About a year ago, such a filter was made of glass. It is of a dark glass plate of about 14 x 5 sq. cm. and 3.1 mm. thick. This so-called dark filter was mounted on a mercury quartz lamp. The author's experiments have confirmed the fact that each object begins to glow in a characteristic manner when it is irradiated by the invisible, filtered, ultra violet rays. According to the physical-chemical structure of the irradiated body, the color of the glow is different for each of them. In this way we find in the Wood light a method whereby different appearing bodies can be identified, and similar appearing bodies differentiated. The author reaches the conclusion that the Wood light is of usefulness in criminal law, bacteriology and dermatology.

The Effect of the Soft Bucky Rays on the Capsule of the Rabbit Kidney. C. Stern, Derm. Wschr. 85, 36, 1927.

The author performed his experiments on rabbits. The effect of the roentgen irradiation on connective tissue formation of the kidney capsule was studied.. The kidneys, freed and displaced by operation, were exposed to the soft Bucky rays, the irradiation time being 8-10 minutes. The animals were killed after 3, 14, 24 and 60 hours, and after 8 days to 4 weeks. As a rule there was found as early as 8 days after irradiation a considerable thickening of the capsule of the kidney, which was demonstrable in the animals killed 4 weeks after irradiation as an enormous thickening. The thickening is 15 to 20 times the normal. At the same time the kidney parenchyma shows no change. The author points out the fact of the stimulation of the connective tissue growth in the treatment of carcinoma by the soft rays.

Treatment of Weak Pains with Diathermy. H. Weitz, Deutsche Med. Wschr. No. 22, June 1, 1928.

Very little is reported in the literature of the value of diathermy in obstetrics. In Nagelschmidt's textbook on diathermy there are only 2 cases reported from Bumm's Clinic. One is concerned with weak pains in missed labor which had been treated in vain with pituitrin. In the second, labor was induced by diathermy. To these two cases the author adds another one treated successfully with diathermy.

The patient was a woman who had given spontaneous birth to the first, a twin, two days before. Upon examination, the cervix admitted a finger with difficulty. The waters had run off the previous day. The head was over the pelvis but movable. According to the woman, she had not felt any fetal movements for 24 hours. The heart tones could not be heard. There were no more pains since the birth of the first twin. There was no rise in temperature. Treatment: Hypophysin 2 cc. but without success; quinin without success; hot bath without success. After these methods had failed the author decided to diathermize the uterus: one electrode on the uterus, the other in the region of the sacrum. After 5 minutes the woman noticed pains which gradually increased. After a quarter of an hour the pains were of a regular character which succeeded in delivering a dead child after one-half hour. The author thought it advisable to report the case because diathermy as a means of inducing labor is not generally known.

Experimental Effect of Roentgen Rays on the Development of Infections. L. Bazy, Bull. Acad. De Med., 92, 4, 1928.

The author has been able to produce an abscess in the guinea pig by means of the simultaneous injection of cultures of streptococci and the Vallee mixture (porphyrised talcum and vaselin oil). The abscess was localized and had no tendency towards extension. An irradiation of 2 ½ H. at 5mm. Al. (focal distance of 20 cm., spark gap of 25cm., irradiation field 10 cm.) is well tolerated by normal rabbits and cannot cause normal non-pathogenic germ plasm to become pathogenic. On the contrary, animals which had a localized abscess as a result of the procedure given above, were quickly killed by one or two irradiations. In all cases there was found a diffuse phlegmon of the abdominal wall with streptococci in pure culture. The blood was always sterile. In one animal there resulted real toxic phenomena without local disease. A further group of animals remained living after 5 irradiations at weekly intervals. They died, however, later, after they had developed tuberculosis. These experimental results should be considered in roentgen therapy where local inflammatory processes arise, and with the appearance of severe toxic infectious conditions after operations on irradiated patients.

On the Present State of Finsen Therapy. A. Reyn, Strahlenther., 28, 2, 1928.

Finsen treatment of skin tuberculosis and other skin diseases are described. Carbon arc light, 20 to 50 amperes, at 55 volts, direct current, is used. The light is gathered by a system of quartz lenses, of greater to smaller focal distances. The concentrated light is very warm. To lead off the heat and to make the field bloodless, a pressure apparatus is used. Sixty per cent of all lupus vulgaris cases can be cured by the exclusive use of the Finsen treatment. Better results are obtained with the concentrated carbon arc light than with the Kromayer lamp. A disadvantage of the light treatment of skin tuberculous is the long duration of the treatment. Only a very small spot of a diameter of 1½ cm. can be submitted to the treatment at a time. The author does not advise roentgen or radium treatment of lupus.

Experiments with Calcium Fixing Substances. G. Mouriquand, A. Leulier, M. Bernheim, J. Schown, Presse Medicale, 14, 1928.

By chemical, histological, and roentgenological experiments on rats, the authors find that adrenalin, powdered adrenal glands, parathyroid and thyroid glands afford no protection against experimental rickets. On the other hand, they were able to confirm once more the antirachitic properties of cod liver oil, but not of its substitutes. Ultra violet light, in contrast to ultra red, Wood light, milk irradiated by the mercury quartz lamp, proved to be strongly antirachitic, and neither the further irradiation of the milk by ultra violet rays, nor long sterilization were able to deprive milk of these properties which had beea once acquired. The same results were obtained in rachitic children. The findings in tuberculous children were more complicated. Cod liver oil and quartz lamp irradiations are of indisputable value in tuberculosis. Whether this is only due to their calcium fixation properties, is doubtful.

Therapeutic Properties of Roentgen Rays of 8 Angstrom. J. Saidman, Cpts. Rend. des Sciences, 186, 3, 1928.

The biological properties of 8 Angstrom are considerably different from ordinary roentgen rays. The tolerance to them is greater, the skin reaction earlier, pigmentation occurs almost directly, and there is no epilation. These properties are different from ultra violet rays in that the latter cause an erythema of the highest intensity after 6 to 24 hours, and the pigmentation disappears, whereas the same continues three or four weeks with rays of 8 Angstrom and the early pigmentation accompanies or follows it. The very slight deep effect does not prevent its therapeutic effect which can be either directly superficial or indirectly deep through an increase in the irradiation fields. The author uses a Dauvillier tube. In the treatment of chronic eczemas and very intractable psoriasis, the multiple patches were treated, for the purpose of comparison, with rays of 1½ to 2 A. at 9kv., with rays of 8A. at 3 kv. and with the mercury lamp. Pruritus was affected, the quickest and most constant, by rays of 8 A., slower and less constantly, by rays of 1½ to 2A. and in very slight degree by ultra violet rays. With two exceptions, the eczema disappeared under treatment by rays of 8A.

Indications for Radium Therapy in Uterine Carcinoma. P. Decker. Schweizerische Med. Wochenschr., No. 13, March 31, 1928.

From the standpoint of the indications for curietherapy or hysterectomy it is necessary to separate completely carcinoma of the body from carcinoma of the portio.

In the present state of radiotherapy carcinomata of the body should be operated as long as they are operable. As soon as they are no longer operable they are to be treated by combined roentgen and radium therapy. The chances of cure in these cases are very small.

In portio carcinoma two types are to be histologically differentiated: (1) First the rare adeno carcinoma, which are to be operated as long as they are operable, treated by radium if not operable and eventually combined with roentgen therapy if the lesion shows a tendency to lateral extension. (2) And on the other hand the squamous cell carcinoma which are the most frequent, whether operable or not, are very amenable to radium. If the lateral extension has progressed very far, roentgen irradiation is the associated treatment. Curietherapy is completely contraindicated if the new growth has als infiltrated the rectovaginal and vesicovaginal septa.

The Applications of High Frequency Currents in Otorhino-Laryngology. J. Kelsmortel. Le Scalpel, No. 5, Feb. 4, 1928.

High frequency is indicated in the treatment of sequela of exudative otitis, as well as those of catarrh of the eustachian tube. It is a highly valuable adjunct to the classical treatment of those diseases in that it not only prevents deafness, but also shortens the time of treatment. High frequency has a favorable effect on acute mastoiditis which arises in the course of an acute exacerbation of a chronic otorrhea. It must, however, not be forgotten that mastoiditis belongs eventually in the domain of the surgeon. Cases of rheumatism of the tempero-maxillary articulation, which on account of the false localization of the pain reach the ear specialist, can also be considerably improved by high frequency treatment. Treatment is through the conduction apparatus, partly through the tragus. Operative interference can be avoided in sinusitis frontalis by the use of the high frequency current. This causes a drainage of the stagnating pus. There is not sufficient experience with its use in the treatment of ozaena- but this much is certain. that before beginning treatment the removal and the softening of the crust must be taken care of.

High frequency currents should be considered as a palliative method, if not as a curative method, in inoperable carcinoma situated at the junction of thetrachea and esophagus.

Experimental and Clinical Investigations of Irradiated Ergosterin. H. Vollmer. Zeitschr. fur Kinderheilkunde, No. 45, Heft 3, 1928.

Experimental rickets in rats can be prevented by the parenteral administration of the antirachitic vitamin. For this purpose oily solutions are just as effectual as oil-ether solutions. Rachitic rats are able to store up the antirachitic vitamin. The author was able to cure rickets in rats by means of subcutaneous, intramuscular or peroral administration of a single large dose of vigantol. After a subcutaneous vigantol injection the serum phosphate content of the normal rabbit gradually decreases, after a short initial rise. Heating vigantol to 200 degrees does not influence its effect, but 280 degrees of heat destroys it. The baking process

does not injure the antirachitic vitamin. The administration of daily doses of 2 to 10 miligrams of vigantol for three weeks cures rickets in children in as short a time as with an intensive irradiation cure. Nevertheless, the treatment has slight effect on craniotabes in beginning rickets. Contrary to the findings in rats, parenteral administration has no effect or only a very slight effect on children. The rickety infant has no ability to store vigantol.

Daily vigantol doses of 1 mg. are necessary for effectual rickets prophylaxis in prematures. At first the phosphate content of the serum of rickety infants is not affected by the administration of large doses of vigantol. The phosphate content does not increase until after five or six days' treatment. Roentgenologically demonstrable calcification fith vigantol treatment runs parallel with the increase of phosphates in the serum. The anemia of rachitic children is not affected by vigantol.

On the Success of Ultra Violet Irradiation of the Eye. W. Gilbert. Med. Klinik, No. 14, April 5, 1928.

The best source of light for eye irradiation was found to be the carbon arc lamp, which is rich in rays absorbed by the cornea. This includes the rays between 280 and 320. The remainder of the rays of the inner ultra violet are absorbed by the lens. The dazzling light and heat rays as well as the so-called external ultra violet rays which cause electrical ophthalmia and photophthalmia are excluded by means of the quartz optic or ultra violet glass filter which transmits the rays only between 450 and 280. Photophthalmia does not occur with the proper use of the apparatus made by Zeiss. There is no irritation even with a daily irradiation of five to seven minutes. This kind of irradiation is not sufficient to cure septic corneal ulcer. The sensitization of the cornea through a fluorescent substance is necessary. Two per cent fluorescein is best for the purpose. The remarkable success of ultra violet eye irradiation can be seen from the fact that the incidence of ulcus serpens in the Konigsberg eye clinic has decreased from 32 per cent to 8 per cent since the introduction of irradiation. This is a great progress in the treatment of corneal inflammations, particularly suppurative processes. But successful results can only be obtained in the hands of those who have thoroughly mastered the technic and have learned how to avoid too small or too large doses.

Further Clinical Observations in Cathode Ray Treatment. Baensch and Finsterbusch. Klinische Wochenschr., No. 15, April 1928.

As a result of their experiments on the therapeutic applications of the Lenard rays, the authors come to the conclusion that these rays are successful in curing a great number of superficial skin diseases, even in such cases where no other method of treatment was successful before. Patience on the part of doctor and patient is of the utmost importance in the use of cathode irradiation because a new application is to be made only upon the disappearance of the previous reaction. There is no danger in this method if treatment is not exceeded. A form of eye protection is necessary. The results obtained until now in lupus, psoriasis and epithelioma were at times astonishing.

The technic is simple. As in roentgen therapy the limit of tolerance was determined empirically. The following were dosages used: The distance between the window of the cathode tube (through which the Lenard irradiation emerged) and the skin was 5 cm. Current 3 ma. and voltage 95 kv. The apparatus was grounded at one pole. The optimal irradiation was ten to fifteen seconds. An erythema then resulted which again completely disappeared so that the dose could be repeated in ten to fourteen days. In deep pathological processes irritations were made up to a duration of three minutes.

Final results cannot yet be given because the method of treatment is still very young.

The Biological X Ray Effect and Its Investigation by Tissue Explanation Method. Martin Schubert. Deutsche Med. Wochensch., 11, 1928.

The changes in the cells after roentgen irradiation, which are visible to the eye, are not specific phenomena. The question as to whether the nucleus or the protoplasm of the cell is sensitive to the x rays can as yet not be decided with certainty. Of the utmost importance to the occurrence of injuries as a result of irradiation is the change in permeability of the cell membrane following irradiation. The roentgen effect influences primarily the cells themselves. The by products of the latter cause a secondary change in the medium, which now on its part produces a change on the cells which were not affected by the rays. In this way a progression of the injury takes place. The view is well founded that the general effect is especially directed to those cell products which are of a protein nature.

The Present State of Roentgen Therapy in Carcinoma of the Cervix. Walter Furst. Die Medizinische Welt, No. 11, March, 1928.

A longer time is required to produce a given change with roentgen irradiation than with radium treatment alone. Roentgen irradiations require four to six weeks to show changes that are often seen much earlier after the insertion of radium. Such beautiful specula pictures that are often seen with radium treatment are very rarely seen with roentgen treatment alone. Usually there still remains an eroded place at least the size of a strawberry. The permanent results following operation combined with roentgen irradiation are better than with operation alone. The possibility of causing a permanent cure with roentgen irradiation alone are very slight. Success is usual only in cases in which roentgen irradiation follows operation. In certain clinics patients receive preoperative roentgen irradiation. These surgeons expect by this method to decrease the danger of peritonitis and to raise the operability. In clinics where radiation therapy alone is employed, roentgen irradiation is most often used as a sort of after treatment after a previous radium irradiation. The

author considers it advisable to precede radium irradiation by an intensive roentgen irradiation. Technically very large doses are now in disfavor. On the contrary the tendency is now towards the use of the hardest possible rays and the application of extremely homogeneous rays by means of corresponding hard metal filtering. In addition there are all kinds of variations such as large and small fields, near and far fields; the application of intensive doses over a short period of time and then again a series of irradiations distributed over weeks. Sometimes small doses frequently repeated are given.

Twenty-five Years of Heliotherapy of Surgical Affections. O. Bernhard Strahlenther. 28, 2, 1928.

The rationale of preserving fresh meat in dry air gave the first idea to expose badly healing wounds to the sun and air. The remarkable success established heliotherapy. Indications for heliotherapy of surgical affections are wounds, osteomyelitis, fractures, ulcus-luicum, skin carcinoma, the treatment of rickets and the whole big field of surgical tuberculosis. Sunlight acts as a bactericide and as an analgesic. The treatment of wounds by sunlight is supported by the dry air of the mountains. Light therapy should not be used only in conjunction with surgical measures. Orthopedic and medical treatment should be also accompanied by light therapy.

On the Application of Diathermy in Gynecology. R. Alamanni. L'Actinother., 6, 2, 1927. Abst. Fort. Auf dem Geb., der Rontg. 37, Heft 5. May 1928.

The author investigated the physical-biological healing properties of diathermy in a large number of cases. In inflammation of the adnext he found cures in 77.98 per cent of the cases, improvement in 20.8 per cent and made worse in 1.8 per cent. He observed the same results in pain in the lumbo-sacral region. Good results were noted in retroversio uteri, where the therapy gradually led to a mobilization of the organ. Whereas there occurred no noteworthy improvement in amenorrhea, the success in dysmenorrhea was remarkably good.

Treatment of Rickets with Milk Irradiated in a Carbonic Acid Atmosphere. K. Scheer. Munch. Med. Wschr., No. 15, April 1928.

Milk contains ergosterin and so it was logical to treat florid rickets with fresh milk irradiated with ultra violet light. In fact the success was so great as to surpass the direct irradiation of children. But as a result of the acids produced by the oxidizing processes in this technic, there arose by-products which greatly injured the taste and flavor of the milk. Moreover, the acid, when the irradiation lasts too long, destroys the activated antirachitic body. If the acid is excluded by conducting the irradiation in a carbonic acid atmosphere. neither the taste or the flavor is injured. This is done by aerating the milk in a carbonic acid stream, causing an intense radiation for a few seconds duration by passing it in thin layers over a mercury quartz lamp. A great number of experiments with rickety children shows that milk treated in this way has all the antirachitic properties. The curative effect of the milk is objectively determined by the rise of the lowered phosphorous content of the serum as well as by the roentgenological changes. Florid rickets is cured in eight weeks without the use of any other method of treatment, but only by the daily administration of 300 to 600 c.cm. of irradiated milk. In the beginning of the therapy the milk is administered in small amounts which in the course of a few days are rapidly increased, the dilution corresponding to the age of the children. The general condition of the children is also remarkably improved by the milk treatment.

There is a possibility that besides ergosterin there are other unsaturated sterins in milk which are caused to have an antirachitic action by the ultra violet rays and are of value in the irradiated milk. There are no changes connected with the irradiation of the milk. There is a slight decrease in the antiscorbutic vitamin C, which can be taken care of by the administration of fruit juices. The equal number of cured cases spread over the year as well as the results of animal experiments speak against the assertion that the number of activatable sterins in the milk are subject to yearly fluctuations. But a good standard effect of the milk is only to be expected when the irradiations are carried out under established methods and by experts who have mastered the technic and where there is constant supervision.

Irradiated milk has the advantage over the other methods of rickets therapy in its value as a prophylactic. Even in prematures who are particularly predisposed to this disease, the daily administration of 10 to 25 g. of irradiated milk inhibits almost entirely or completely the development of rachitic symptoms. In addition to its effectiveness, this method of treatment has other advantages. Owing to the indifference of the great masses a general prophylaxis with medicines or other preparations cannot be put into practice. By the addition of a small amount of irradiated milk. to each feeding, a method of treatment is possible in infants which are not under the supervision of doctors. Thus at a very small cost rickets can be generally prevented. Milk therapy in rickets is very cheap. The cost is about one-tenth as much as direct ultra violet irradiation. The state department of health of Frankfort has carried out this kind of prophylaxis on a large scale since the middle of January. The results are of inestimable value to other communities.

Investigations of the Effect of Graduated Roentgen Rays of Different Wave Lengths on the Structure and Function of the Ovary. P. Schugt. Strahenth., 27, Heft 4.

The biological effect of various hard roentgen rays is as yet not known. It was not known until now whether there is a difference functionally, in the effect on the ovary, of graduated doses of roentgen rays of various degrees of hardness. The author undertook ex-

tensive experiments to answer these questions. He irradiated over 100 white mice with doses from 1 to 180 R. with a hardness of 180 at 10 kw. The castration dose for white mice was found to be 54 S.

A dose of 42 R. was sufficient, with the soft rays, to cause a regression of the follicle so that pregnancy did not occur any more. But even with small doses as low as 21 R. injuries to the follicular apparatus could be determined. The injuries are always also present in the primary follicle. The primary follicle is therefore not less sensitive than the rest of the follicular apparatus as has often been assumed. This is important in order to understand temporary castration. The size of the dose is important in relation to the degree of injury and the rapidity with which the destruction of the follicle takes place. With 280 R. there is nothing left of the follicular apparatus in six weeks, whereas with smaller doses well preserved follicles are still demonstrable after the same length of time. The final stage of the changes is reached after four and one-half months.

Differences of function in ovaries treated with soft or hard rays were not determinable. Follicular epithelial rests, in one or more layers, corpus luteum tissue and well preserved germinal cells may be found until seven months after the administration of the castration dose and more up to 140 R. Changes in the interstitium of the ovaries of castrated mice were demonstrable, such as have often been described as characteristic of the interstitial glands. Rut did not disappear after the administration of the castration dose or more up to 140 R.

The roentgen irradiation succeeded in destroying the external secretion of the ovary which gives rise to ovulation, whereas the internal secretion of the rut hormone was preserved. It was impossible to inhibit the production of the rut hormone with doses of about two and one-half times the castration dose and with a time duration of about one-half year after irradiation.

Sunlight and Artificial Light Therapy in Tuberculosis. Orville Egbert, M. D. Texas State J. of M., Dec. 1927.

Heliotherapy is the application of physical agents to bring about primitive skin. We are, therefore, working to the end that the patient expose his nude body to intense sunlight, rich in the ultra violet end of the spectrum, air, air motion and temperature change, and do it consistently.

The management of the early steps must be handled delicately and slowly, but can be simplified and understood by proper employment of all physical agents, recognizing that application of one of the agents is no means to an end.

Study of sunlight at favorable locations will reveal artificially generated light as a poor substitute for the parent energy. At most, it can only be used as an adjunct to one phase of heliotherapy.

Heliotherapy is indicated in tuberculosis because it restores the functioning of the heat regulator and the blanket of body protection. The increasing of the vitality of so extensive a structure can only react favorably upon the general health of the individual.

Heliotherapy, properly applied, proves the theory a fallacy that assumes it a valuable agent in one phase of the same disease and contraindicated in another.

Technic of Diathermy Treatment of Accessible Neoplasms. Rahel Hirsch. Die Med. Welt, No. 13, March 31, 1928.

The differentiation is made between medical diathermy, in which healthy or diseased tissue is not injured relative to its function or vitality of structure, and surgical diathermy, in which the heat is raised to such a degree until there is desiccation, coagulation, or complete necrosis. The occurrence of the desired coagulation can be determined by the sudden decrease in the current as seen in the amperemeter. The degree of temperature is measured by means of a thermo-element. Local anesthesia or narcosis is necessary in the application of surgical diathermy. The value of the method lies in the prevention of tumor transplantation since complete sterilization of the field of operation is possible.

The Limits of Roentgen Irradiation. Paul Hussy. Schweizerische Med. Wochenschr., No. 13, March 31, 1928.

A critical review of the literature and his own cases have led the author to the conclusion that schematic indications for the treatment of myomas cannot be maintained yet. The first prerequisite is an exact diagnosis. This is often neglected. Where only a tentative diagnosis is possible, irradiation is contraindicated because it can cause more harm than good under certain circumstances. The illusion that roentgen irradiation is harmless must once and for all be dispelled. The possibility of roentgen carcinoma must be considered. Irradiation, however, must not be discredited and the demand of Schubert that all myomas be operated is surely exaggerated. But irradiation should only be instituted when the diagnosis of a myoma without any further complications is definitely established, when the only symptom is increased menstrual flow and when the woman is at least 40 years of age. (Some authors even demand 45 years of age.) If one confines himself within these limits and if the tumor is not too large, then good results can be obtained.

The Therapeutic Spectrum. E. M. Kime, M. D., and K. D. Ayers, M. D. Am. J. P. T., June 1928.

1. Modern physical therapy is based upon an accurate knowledge of biophysics, is objective rather than subjective, and definite indications and contraindications exist.

2. The indications are those wherein the various physical agencies heat, light, and those providing graduated physiological exercise, are utilized either alone or in conjunction with other orthodox medical and surgical methods.

3. Accurate diagnosis is essential. Sufficient time and attention should be given each patient to determine what is wrong, and how it can best be corrected.

4. Contraindications depend upon: (1) The nature of the lesion. If a clear cut medical or surgical indication exists, physical therapy is contraindicated. (2) The variety of energy available and the state of efficiency of the electrical equipment. (3) The experience of the operator.

5. No one other than a duly qualified physician should be permitted by law to prescribe physiotherapeutic measures.

On the Biology of Ultra Violet Light. Reaction of Human Skin to Repeated Ultra Violet Irradiations. L. Schall. Strahlenth., 27, Heft 4.

After the application of scattered doses there finally occurs a weaker effect following a single irradiation. The effect of time can be definitely evaluated twelve hours after the preirradiation. Its middle value is 53 per cent after one day, 70 per cent after four days, and 90 per cent after eight days. After a definite time, on the average after fifty days the phenomenon disappears again. The kind of preirradiation has an influence on the amount of the attenuating effect. More frequent small doses cause the skin to become accustomed sooner than less frequent intensive doses, the total dosage being the same. The higher doses causing a greater degree of erythema usually cause a greater attenuation than the smaller doses.

The individual variations are considerable. The habituation can occur without the demonstrable presence of pigment. The habituation effect was observed in an albino, whereas on the other hand, there was observed a complete absence of the attenuating effect in a strongly pigmented person on whom the experiment was performed. Pigment does not play any role at all in the protection against light. The attenuating phenomenon has no specificity for different wave lengths. here is a definite specificity, however, towards roentgen rays. As to the cause of the attenuating phenomenon, the changes taking place in the organism as a whole cannot be taken into consideration. It is more likely the question of a purely local tissue function.

The Infectious Complications of Radiotherapy of the Cervix Uteri. Docteur J. E. Gendreau. Am. J. of P. T., May 1928.

The danger of infectious complications necessitates the following line of conduct of the radiotherapic treatment of cancer of cervix uteri:

1. Hospitalization of the patient before applications for all the clinical and laboratory examinations and for disinfection by appropriate methods: bacteriotherapy, serotherapy, chemotherapy (different tonicities), ionotherapy (Wintz). The streptococcus, being particularly resistant, will probably not react to anything but auto-vaccine, tamponnings and local dressings, or to propidon (Laborde and Wickham).

2. Surgical asepsis in the utero-vaginal application; prudence and watchfulness during the radiotherapic treatment, which should generally be recommended only after the elimination of all signs of infection. The hourly intensity of the irradiation must not be very high, although remaining sufficient and efficacious.

3. Prolonged hospitalization during the reaction, to support the strength, and to give all the usual antiseptic care to the vagina, rectum and bladder, and to combat all the complications by the methods already indicated.

It is evident that this ensemble, so easily enumerated, but so difficult to combine, requires the collaboration of many specialties, which the present treatment of cancer assembles around the same bed; thus only will we have the great satisfaction of realizing sometimes that work of art, of science, of devotion, namely, the recovery from inoperable and advanced cancer of the cervix uteri; and for these cases, at least, the most skeptical will be forced to say with J. L. Faure (Cancer of Uterus, 1925): "There is one treatment which now is a hundred times superior to all others, namely treatment by radium. . . . I am certain that it is today demonstrated that for inoperable cancers radium gives admirable results, which are above all that we dreamed of twenty years ago in that sad period when discouraged surgeons did not even try to take care of the poor women for whom they had lost all hopes and abandoned them to the consoling illusions which morphine gives."

Diathermy in the Treatment of Lobar Pneumonia. John Severy Hibben, M. D. Am. J. of P. T., May 1928.

1. There is improvement in nearly every case of pneumonia treated with diathermy.

2. The symptomatic changes being a lessening of the cynosis and respiratory pain, with a slight lowering of the pulse and respiratory rate. Reduction in temperature by lysis eliminating that critical period which follows its abrupt fall.

3. Diathermy, to be the most effective, should be used as early in the disease as possible. If seen in early stage, resolution by lysis in four to five days is the rule. If the case has reached the second or red hepalization stage before diathermy has been applied, improvement is not so marked. In stage of grey hepalization or resolution diathermy may be used, providing the patient is not gravely toxic.

4. Diathermy can be used as an adjunct to the treatment of pneumonia without interfering with any other recognized form of treatment.

5. Before treating a patient with diathermy be sure of your water balance, that is, that the patient is not dehydrated.

6. From a comparatively small series of cases studied, it appears that mortality has been reduced 60 per cent by the use of diathermy.